GWY-500
(Profibus Gateway)

USER'S MANUAL

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MANUAL REVISION

If you contact us in refference to this manual, please include the following document number

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Revision	:	Revision 0

Revision Number	Date	Description
Preliminary	10/11/2005	
Revision 0	19/01/2006	GSD file location is specified.

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IMPORTANT

Gateway Products are intended to be Protocol Converters/Data Sharer devices that can also take control actions on request of device being connected. It is assumed that user is well acquainted with the PLC / Inverters / Controllers being used.

Any Mechanical or Electrical Modification to this Unit will void all Warranties.

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INTRODUCTION

In this chapter. . . .

- Purpose of this manual
- Introduction To Gateway
- GWY-500-B Specifications

1.1 Purpose of this manual

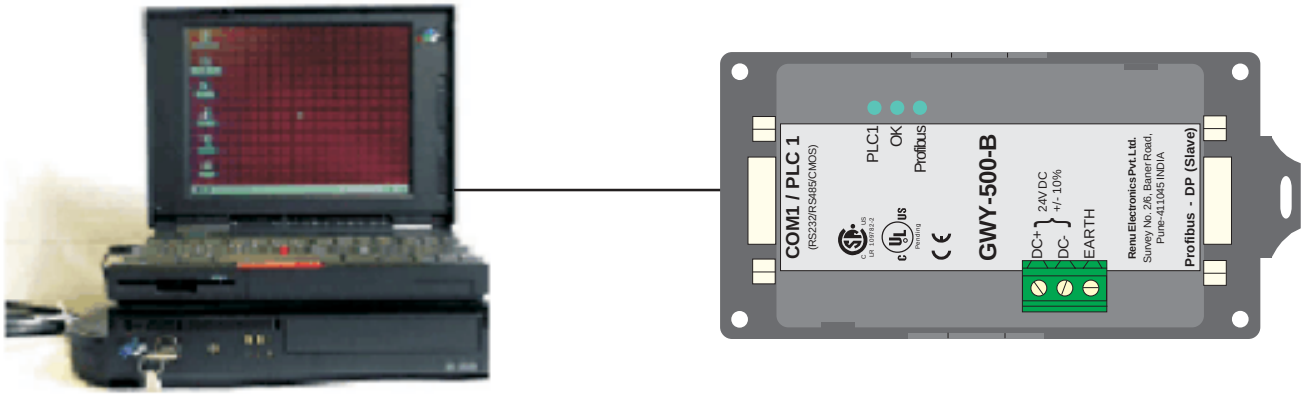
Thank you for purchasing GWY-500-B Product from Renu Electronics Pvt. Ltd..

The intention of this User Manual is to provide a guide for Safe installation, Configuration and operation of GWY-500-B. **Functionality of all the Gateway models is same.**Read this User manual thoroughly before installing and operating GWY-500-B,
This document is based on information available at the time of its publication. While efforts have been made to be accurate, the information in this document may not cover all the details or variations in hardware or software. Features described herein may not be present in all hardwares. Renu Electronics Pvt. Ltd. reserves the right to update information in this publication without prior notice.

1.2 Introduction to Gateway

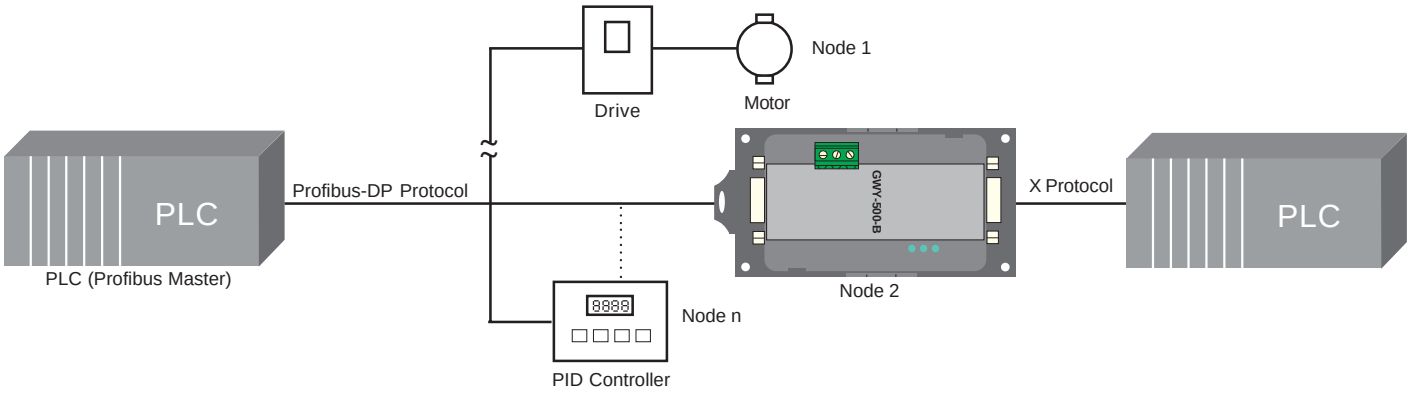
Gateway is a Protocol Converter / Data sharer for devices like PLCs, inverters (Adjustable Speed Drives), and other Controllers. Gateway has two serial ports that connect with two different devices. These devices share data through Gateway. Gateway communicates with a device to get the information required by the device connected on the other port. The device that requires data is called Destination Device and the device that provides data is called Source Device. Information could be,
- value of a PLC register.
- status of a PLC coil.
- Command from Source Device to Destination Device to perform any action at the destination end.

Configuration Of Gateway



Note: Please refer 'IBM Download' in section 3.4.

Normal Operation:



Connect Profibus Master device to Gateway via Profibus port and serial device(PLC or Inverter) via the PLC's communications port (correct cables are required) and the PLCs can easily exchange information with the Profibus-DP devices.

1.3 GWY-500-B Specifications

Power	:	24 V DC, 2.5 W
LED's	:	3 LED's for status indication
Communication Ports	:	2 Communication ports with
		COM1 : RS232 / RS422 / RS485 / CMOS
		COM2 : Profibus-DPV0 Slave (2 Wire RS485)
(Isolation between communication ports and Power supply, through DC-DC coupler is 1 KV)		
COM1 / PLC1	:	Connects to PC for setup download or connects to PLC1 at runtime.
COM2 / PLC2	:	Profibus-DPV0 Slave (2 Wire RS485)
(Isolation between communication ports, through opto-isolation is 1KV rms for 1 min)		
Profibus Baud Rate	:	9.6k, 19.2k, 45.45k, 93.75k, 187.5k, 500k, 1.5M, 3M, 6M, 12M Bit/s (Autodetect)
GSD File	:	Supplied with the unit
GSD File Name	:	RENU0A0E.GSD
I/O data	:	100 Word Input, 100 Word Output
*Profibus Slave ID	:	0 - 125 (ID should be provided through Gateway Setup Software/PLC2 Settings/Advanced)
Operating Temperature	:	0^{o} to 60^{o}C
Storage Temperature	:	-20^{o} to 80^{o}C
Humidity	:	10% to 90% (Non condensing)
Mounting	:	DIN rail or back panel mounting
Dimensions (DIN rail)	:	105mm(L) X 40mm(D) X 51mm(W)
Weight	:	125 gm approx.
Certifications	:	CE with UL certification
Immunity to ESD	:	Level 3 as per IEC1000-4-2
Immunity to Transients	:	Level 3 as per IEC1000-4-4
Immunity to Radiated RF	:	Level 3 as per IEC1000-4-3
Immunity to Conducted RF	:	Level 3 as per IEC1000-4-6
Emissions	:	EN55011 CISPR A

Note1 : If Toshiba VF-S11 Inverter is connected at COM1 of GWY-500-B, station number is detected automatically at power ON and that station number is assigned as a Profibus Slave ID.
Inverter ID Can be set from 0-99.

Note2 : Once You install Gateway Setup Software, you will find GSD file at:
*"**C:\Program Files**\Gateway 3.09\GWY-5oo(Profibus Gateway)\GSD"*. This is the default path. The actual path is where the user has installed GatewaySetup Software.

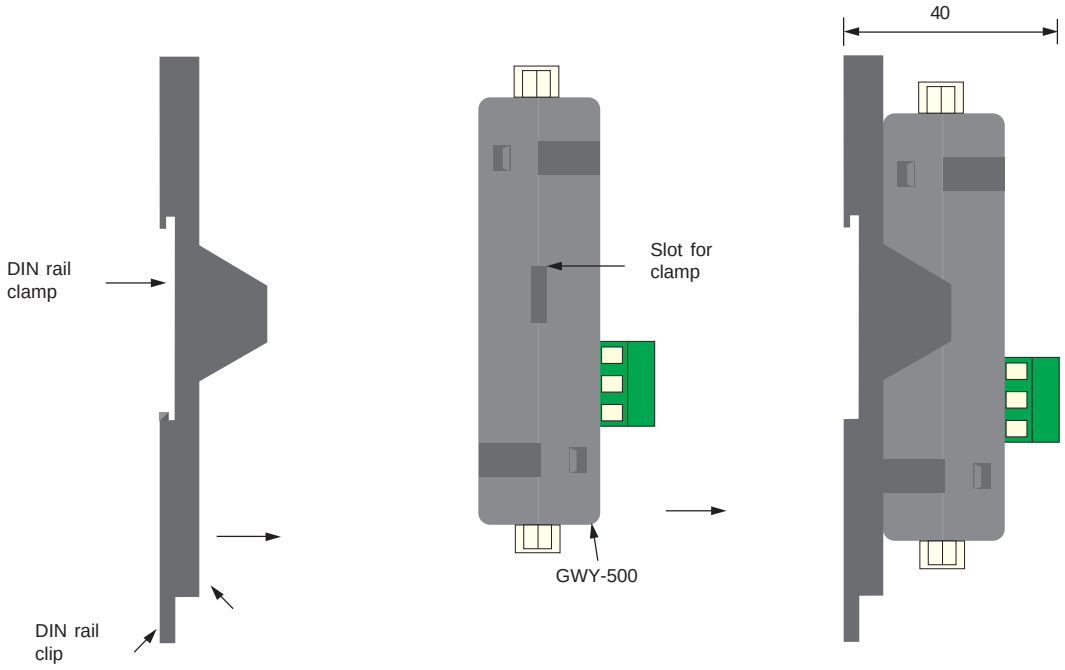
HARDWARE

In this chapter. . . .

- Dimensional Details And Mounting Instructions
- Communication Port Details
- LED Status

2.1 Dimensional details And Mounting Instructions

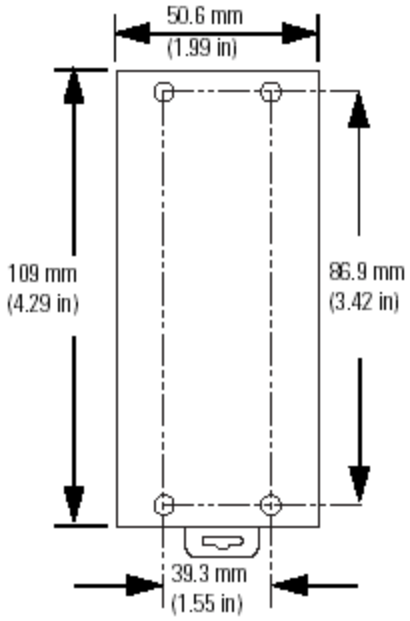
GWY-500 -B unit can be mounted on a back panel or on a DIN rail or can be left hanging. It comes with a separate DIN rail plate when it is packed. User will have to attach the DIN rail plate to the unit if it has to be mounted on a panel or DIN rail. If it has to be left hanging, make sure to screw the cables to the DB9 connectors on the Gateway unit. DIN rail plate also has the provision to screw the unit to the back panel. Following drawing shows how to attach the DIN rail plate to the unit:



Follow instructions given below:

1. Attach the DIN rail plate to the unit using the clamps on the DIN rail plate.
2. Pull out the clip of the plate.
3. Put the unit on the DIN rail.
4. Push the clip in to secure the unit on the DIN rail.

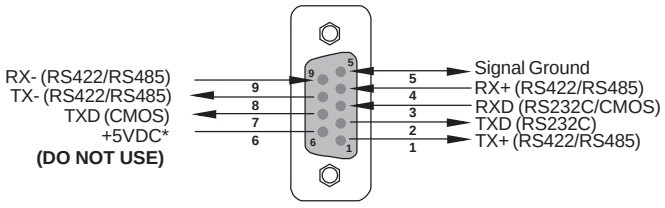
GWY-500-B unit is shipped with a separate DIN rail plate which has to be attached to the unit, if needed. User can use the unit with or without the DIN rail plate. Following sketch shows mounting details of GWY-500-B with the DIN rail plate.



2.2 Communication Port Details

Gwy-500-B has two communication ports COM1 and COM2. COM1 port is compactible to RS232/ RS422/ RS485 and CMOS signal levels. Pinout of this port is given as follows:

PLC1 / COM1



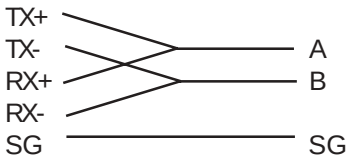
DB9 Female

**Do not use pin no. 6 of PLC1 / COM1.*
***Refer our website (www.renuelectronics.com) for your specific Cable requirements*

Pin Description

Pin	Name	Signal Level	Description
1.	TX+	RS422 / RS485	Differential Transmit +, also referred as TXA
2.	TXD	RS232	Transmit
3.	RXD	RS232 / CMOS	Receive
4.	RX+	RS422 / RS485	Differential Receive +, also referred as RXA
5.	GND	-	Signal Ground common to all signals.
6.	+5VDC	-	**DO NOT USE**
7.	TXD	CMOS	Transmit
8.	TX-	RS422 / RS485	Differential Transmit -, also referred as TXB
9.	RX-	RS422 / RS485	Differential Receive -, also referred as RXB

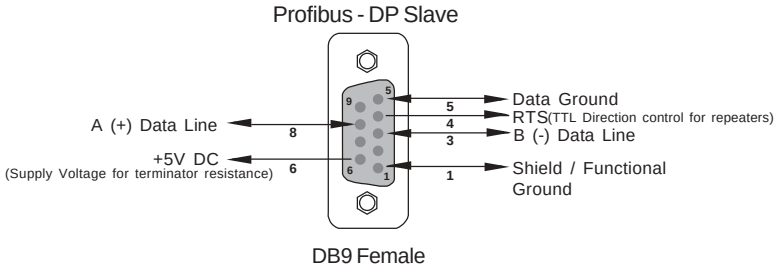
User can convert RS485 4 wire + Signal Ground system to a 2 Wire + Signal Ground system by shorting following signals in the communication cable:



<u>Note:</u> If user has attached shield to Earth on Device end, leave the shield open on Gateway end. If user has connected shield to Signal Ground on Device end, connect shield to Signal Ground on Gateway end.

A and B are polarity insensitive. Twisted pair cable should be used for Rs485 Network.

***Upto 31 Devices can be multi-dropped on RS485* port of Gateway.**



Data Line: The Profibus user group recommends the following color coding for the data signal lines:

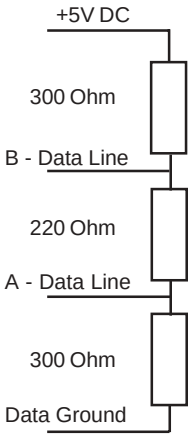
A-Data Line = Green **B-Data Line = Red**

These data signal lines must be connected to the corresponding signal terminals or pins at the master unit and other stations (i.e.A to A, B to B).

RTS: The signal RTS (TTL signal relative to Data Ground) is meant for the direction control of repeaters in case repeaters without self control capability are used.

+5V DC, Data Ground: The signals +5V DC and Data Ground are meant to power an externally mounted bus terminator.

The powering of the 220 © termination resistor ensures a defined idle state potential on the data lines. To ensure proper functioning up to the highest baud rate, each bus segment has to be terminated at both ends of the cable.



2.3 LED Status

There are 3 Bicolor LEDs for status indication.

Bicolour LEDs status:

LED			
OK	Green	OFF	No Firmware
		Flashing	IBM Download
		ON	Both side (COM1 and COM2) communication OK
	Red	OFF	Configuration Ok
		ON	Configuration Fault
PLC1	Green	OFF	No data received on PLC1 Port
		Flashing	Receving data on PLC1 Port
		ON	-
	Red	OFF	No error in PLC1 attach or while block execution
		Flashing	PLC1 attach error or error while block execution
		ON	-
Profibus	Green	OFF	No data received on Profibus Port
		Flashing	Receving data on Profibus Port
		ON	-
	Red	OFF	Data exchange with Profibus Master
		Flashing	-
		ON	No data exchange with Profibus Master

GETTING STARTED

In this chapter. . . .

- Introduction To Profibus
- Introduction To GWY-500-B
- GWY-500-B Operation

3.1 Introduction To Profibus

PROFIBUS is a vendor-independent, open fieldbus standard for a wide range of applications in manufacturing, process and building automation. Vendor independence and openness are guaranteed by the PROFIBUS standard EN 50170. With PROFIBUS, devices of different manufacturers can communicate without special interface adjustments.The PROFIBUS family consists of three compatible versions:

High speed	PROFIBUS-DP **DP** stands for Decentralised Periphery. It is optimised for high speed and low cost interfacing, especially designed for communication between automation control systems and distributed I/O at the device level.
Process Automation	PROFIBUS-PA **PA** stands for Process Automation. It permits sensors and actuators to be connected on one common bus line even in intrinsically-safe areas. It permits data communication and power supply over the bus using 2-wire technology according the international standard IEC 1158-2.
Higher level	PROFIBUS-FMS **FMS** stands for Fieldbus Message Specification. This version is the general purpose solution for communication tasks at a higher level. Powerful services open up a wide range of applications and provide great flexibility. It can also be used for extensive and complex communications tasks.
Uniform bus access protocol	PROFIBUS-DP and PROFIBUS-FMS use the same transmission technology and a uniform bus access protocol. Thus, both versions can be operated simultaneously on the same cable. However, FMS field devices cannot be controlled by DP masters or vice versa.

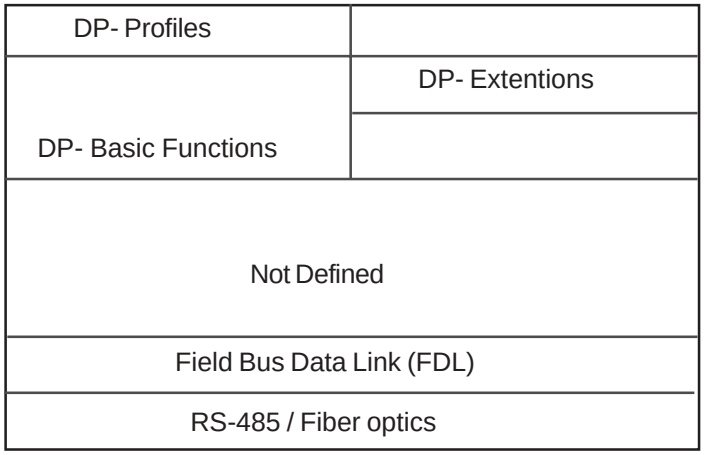
Note: It is not possible to exchange one of these family members by another family member. This will cause faulty operation.

The rest of this section only describes PROFIBUS-DP.Protocol architecture.

3.1.1 Protocol Architecture

OSI The PROFIBUS protocol architecture is oriented on the OSI (Open System Interconnection) reference model in accordance with the international standard ISO 7498. Layer 1 (physical layer) of this model defines the physical transmission characteristics. Layer 2 (data link layer) defines the bus access protocol. Layer 7 (application layer) defines the application functions.

User Interface Layer
(7) Application Layer
(6) Presentation Layer
(5) Session Layer
(4) Transport Layer
(3) Network Layer
(2) Data Link Layer
(1) Physical Layer



Layer 1, 2 and user interface

PROFIBUS-DP uses layers 1 and 2, and the user interface. Layers 3 to 7 are not defined. This streamlined architecture ensures fast and efficient data transmission. The application functions which are available to the user, as well as the system and device behaviour of the various PROFIBUS-DP device types, are specified in the user interface.

Transmission medium

High-speed, inexpensive

RS-485 transmission technology or fibre optics are available for transmission. RS-485 transmission is the most frequently used transmission technology. Its application area includes all areas in which high transmission speed and simple inexpensive installation are required. Twisted pair shielded copper cable with one conductor pair is used.

Easy installation

The RS-485 transmission technology is very easy to handle. Installation of the twisted pair cable does not require expert knowledge. The bus structure permits addition and removal of stations or step-by-step commissioning of the system without influencing the other stations. Later expansions have no effect on stations which are already in opera tion. Transmission speeds between 9.6 kbit/s and 12 Mbit/s can be selected. One unique transmission speed is selected for all devices on the bus when the system is commissioned.

Cable length

The maximum cable length depends on the transmission speed The specified cable lengths are based on type-A cable. The length can be increased by the use of repeaters. The use of more than 3 repeaters in series is not recommended.

3.1.2 Device Types

PROFIBUS distinguishes between master devices and slave devices.

Master devices

Master devices determine the data communication on the bus. A master can send messages without an external request, as long as it holds the bus access right (the token). Masters are also called active stations in the PROFIBUS standard.

DPM1, DPM2

There are two types of master devices: DP master class1 (DPM1) and DP master class2 (DPM2). A DPM1 is a central controller which exchanges information with the decentralised stations (i.e. DP slaves) within a specified message cycle. DPM2 devices are programmers, configuration devices or operator panels. They are used during com missioning, for configuration of the DP system, or for operation and monitoring purposes.

Slave devices

Slave devices are peripheral devices. Typical slave devices include input/output devices, valves, drives, and measuring transmitters. They do not have bus access rights and they can only acknowledge received messages or send messages to the master when requested to do so. Slaves are also called passive stations.

3.1.3 PROFIBUS-DP Charactristics

3.1.3.1 Bus Access Protocol

Layer 2

The bus access protocol is implemented by layer 2. This protocol also includes data security and the handling of the transmission protocols and messages.

Medium Access Control

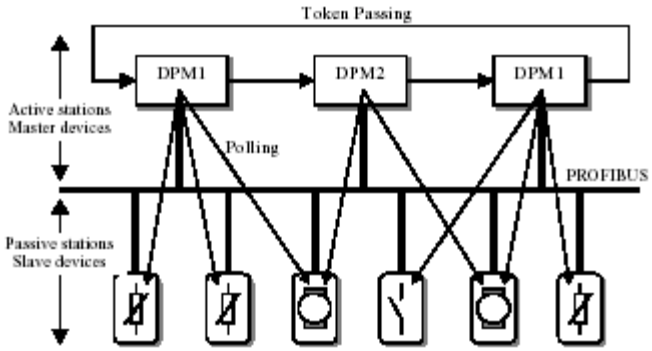
The Medium Access Control (MAC) specifies the procedures which determine when a station is permitted to transmit data. A token passing procedure is used to handle the bus access between master devices, and a polling procedure is used to handle the communication between a master device and its assigned slave device(s).

Token passing

The token passing procedure guarantees that the bus access right (the token) is assigned to each master within a precisely defined time frame. The token message, a special message for passing access rights from one master to the next master, must be passed around the logical token ring - once to each master - within a specified target rotation time. Each master executes this procedure automatically. A user can only change the target rotation time, but is not recommended.

Polling procedure

The polling or master-slave procedure permits the master, which currently owns the token, to access its assigned slaves. The picture below shows a possible configuration The configuration shows three active stations (masters) and six passive stations (slaves).



The three masters form a logical token ring. When an active station receives the token message, it can perform its master role for a certain period of time. During this time it can communicate with all assigned slave stations in a master- slave communication relationship, and a DPM2 master can take the initiative to communicate with DPM1 master stations in a master-master communication relationship.

Multi-peer communication

In addition to logical peer-to-peer data transmission, PROFIBUS-DP provides multi-peer communication (broadcast and multicast).

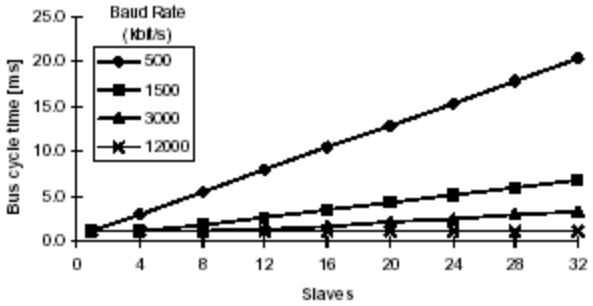
Broadcast communication: An active station sends an unacknowledged message to all other stations (masters and slaves).

Multicast communication: An active station sends an unacknowledged message to a predetermined group of stations (masters and slaves).

3.1.3.2 Data Throughput

Transmission time

At 12 Mbit/s, PROFIBUS-DP requires only about 1 ms for the transmission of 512 bits of input data and 512 bits of output data distributed over 32 stations. The figure below shows the typical PROFIBUS-DP transmission time depending on the number of stations and the transmission speed. The data throughput will decrease when more than one master is used.



3.1.3.3 Diagnostic Functions

Extensive diagnostics

The extensive diagnostic functions of PROFIBUS-DP enable fast location of faults The diagnostic messages are transmitted over the bus and collected at the master. These messages are divided into three levels:

Device related diagnostics

1. Device related diagnostics
These messages concern the general operational status of the whole device (e.g. overtemperature or low voltage).

Module related diagnostics

2. Module related diagnostics
These messages indicate that a fault is present in a specific I/O range (e.g. an 8-bit output module) of a station.

Channel related

3. Channel related diagnostics
These messages indicate an error at an individual input or output (e.g. short circuit on output 5).

3.1.3.4 Protection Mechanism

Time monitoring

PROFIBUS-DP provides effective protection functions against parameterisation errors or failure of the transmission equipment. Time monitoring is provided at the DP master and at the DP slaves. The monitoring interval is specified during the configuration.

At the master

1. Protection mechanism at the master.
The DPM1 master monitors data transmission of its active slaves with the Data_Control_Timer. A separate control timer is used for each slave. This timer expires when correct data transmission does not occur within the monitoring interval.
If the master's Auto_Clear mode is enabled, the DPM1 exits the 'Operate' state, switches the outputs of all assigned slaves to fail-safe status, and changes to its 'Clear' state.

At the slave

1. Protection mechanisms at the slave.
The slave uses the watchdog control to detect failures of the master or the transmission line. If no data communication with the master occurs within the watchdog control interval, the slave automatically switches its outputs to the fail-safe status. This mechanism can be enabled or disabled for each individual slave.
Also, access protection is available for the inputs and outputs of the DP slaves operat ing in multi-master systems. This ensures that direct access can only be performed by the authorised master. For other masters, the slaves offer an image of their inputs and outputs, which can be read by any master, even without access rights.

3.1.3.5 Network States

PROFIBUS-DP distinguishes four different network states.

Off-line

1. Off-line
Communication between all DP participants is stopped.

Stop

2. Stop
Communication between DPM1 and DP slaves is stopped. Only communication between DPM1 and DPM2 is possible.

Clear

3. Clear
DPM1 master attempts to set parameters, check the configuration, and subsequently perform data exchange with its associated DP-slaves. The data exchange comprises reading the inputs of the DP-slaves and writing zero's to the outputs of the DP-slaves.

Operate

4. Operate
DPM1 master exchanges data with its assigned slaves, inputs are read and outputs are written. Beside this, the DPM1 cyclically sends its local status to all assigned DP slaves (with a multicast message) at a configurable time interval.

Auto_Clear

When an error occurs during the data transfer phase of the DPM1, the 'Auto_Clear' configuration setting determines the subsequent actions. If this parameter is set to false, the DPM1 remains in the 'Operate' state. If set to true, the DPM1 switches the outputs of all assigned DP slaves to the fail-safe state and the network state changes to the 'Clear' state.

3.1.4 Device Data Base Files

GSD-file

To achieve straightforward configuration of a PROFIBUS-DP network, the characteristic features of a device are specified in a file. This file is called a GSD-file (Gerätestammdaten file). The language of the GSD file is expressed with the last letter from the extension, *.GS?:

Default	: =	GSD
English	: =	GSE
Deutsch	: =	GSG
Italian	: =	GSI
Portugees	: =	GSP
Spanish	: =	GSS

The GSD files are prepared individually by the vendor for each type of device, according to a fixed format. Some parameters are mandatory, some have a default value and some are optional. The device data base file is divided into three parts:

General section

1. General specifications
This section contains the vendor name, the device name, hardware- and software release versions, station type and identification number, protocol specification and supported baud rates.

DP-master section

2. DP master-related specifications
This section contains all parameters which only apply to DP master devices (e.g. maximum memory size for the master parameter set, maximum number of entries in the list of active stations, or the maximum number of slaves the master can handle).

DP-slave section

3. DP slave-related specifications
This section contains all specification related to slaves (e.g. minimum time between two slave poll cycles, specification of the inputs and outputs, and consistency of the I/O data).

Configurator

The device data base file of each device is loaded in the configurator and downloaded to the master device. Refer to the Operation Manual of the PROFIBUS-DP Master Unit for usage of the GSD file in the master's configuration software.
GSD files are usually supplied with each unit. Alternatively, GSD files can be downloaded from the Internet, either from the manufacturer's site, or from the GSD library of the PROFIBUS Nutzerorganisation at http://www.profibus.com.

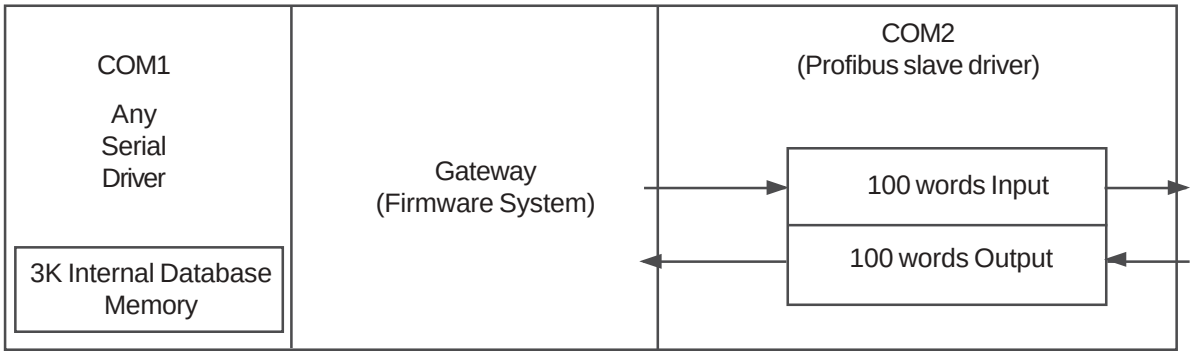
3.1.5 Profiles

Exchanging devices

To enable the exchange of devices from different vendors, the user data has to have the same format. The PROFIBUS-DP protocol does not define the format of user data, it is only responsible for the transmission of this data. The format of user data may be defined in so called profiles. Profiles can reduce engineering costs since the meaning of application-related parameters is specified precisely. Profiles have been defined for specific areas like drive technology, encoders, and for sensors / actuators.

3.2 Introduction To GWY-500-B

GWY-500-B is a communication bridge between Profibus Network interface on one side and various serial protocols on the other side. GWY-500-B allows serial devices to act as Profibus Slave on Profibus Network.



On COM1 side it supports serial protocols (e.g. Modbus Mastre, Modbus Slave) and on COM2 side it has Profibus DPV0 Slave Protocol.

Profibus Slave uses internal memory. It is divided into two parts, Input Area and Outptut Area. Profibus master writes data in Output Area and reads the data from Input Area. With Gateway project it is possible for serial devices to read the data from Output Area and write the data in Input Area of Profibus Slave.
GWY-500-B is externally powered from 3 pin terminal block and power is isolated from both communication ports. Both the communication ports are also isolated from each-other. It has two communication ports, one with Profibus-DPV0 network interface (9.6Kbps to 12 Mbps) and serial port with RS232 / RS422 / 2 or 4 wire RS485 (300 to 115.2K).

Microsoft Windows® based configuration software, Gateway Setup, helps user to configure Gateway unit. 'Configuration' means making the Gateway unit work as per the system requirements. The complete configuration for a unit is termed as 'Project'. Project comprises of device names, Register addresses,condition for block execution etc.
Block may contain information like copy number of words from one device to other device and conditions for copy, if any. Gateway transfers data between two devices by execution of blocks.

After the Project is defined, Drivers for required devices and Project should be downloaded. Gateway can now communicate with the Profibus-DP Slave devices and serial devices(e.g. PLC or SCADA).

3.3 GWY-500-B Operation-Configuration And Communication

Gateway can communicate with serial and Profibus devices using appropriate cables and configuration. Microsoft Windows® based configuration software, Gateway Setup, configures the Gateway unit. 'Configuration' means making the Gateway unit work as per system requirements.

Complete configuration for a Gateway using the Gateway Setup is termed as a 'Project'. A Project consists of Devices to be attached on two ports, Communication settings for two ports to communicate with two devices, Register addresses for data transfer, Conditions for data transfer etc.

Gateway can now communicate with the specified devices without any change in the Gateway hardware. To communicate with a device, Gateway needs Communication Drivers for the devices and 'Gateway - Device' communication cables.

Each Device has a unique and predefined protocol for communication. Gateway driver has this protocol to communicate with the desired device. As two devices are connected on Gateway, it requires two drivers for communication.

3.4 Configuration of GWY-500-B (IBM Download)

User MUST download Project, PLC1 driver and PLC2 driver in Gateway before installing any system using Gateway. Gateway can accept drivers and configuration data on either of the ports. User needs a special IBM download cable for downloading configuration in Gateway. All configurations can be downloaded only form Serial port (Port 1). The other port is dedicated for Profibus Slave (Port 2).

If any change in the current / working project is made, user must download the changed project in Gateway.

Pin details of IBM download cable for GWY-500-B are as follows:

DB9 Male (Gateway)	DB9 Female (IBM)
2	2
3	3
5	5

1.For downloading Firmware,drivers and project switch off the GWY-500-B unit.
2.Power ON the unit again.Ok LED starts blinking. This means that unit is in download mode.
3.For the first time download all firmware,drivers and project.

IMPORTANT NOTE:
AS GATEWAY HAS MULTIPLE SIGNALS ON ITS COMMUNICATION PORTS, IBM CABLE FOR GATEWAY MUST HAVE ONLY THREE RS232 SIGNALS (TXD, RXD AND GND) AS MENTIONED ABOVE.

9-9 PIN CORE CABLE SHOULD NOT BE USED.

3.4.1 When GWY-500-B can accept configuration?

If current driver present for PLC1 port is Master (e.g. Modbus (Gateway as Master))

First, it is checked that whether device is connected on port1
If device is connected, it continues normal operation
If device is not connected, it checks for IBM download mode for 10sec.
This sequence continues until either is satisfied.

If current driver present for PLC1 port is Slave (e.g. Modbus (Gateway as Slave))

If Port1 of Gateway is Slave, all the configurations should be downloaded Only once for 10sec at power on.

Note: Make sure that OK LED is blinking when you start downloading the configuration in Gateway.

GWY-500-B FEATURES

In this chapter. . . .

- Gateway Modes
- Repeat Cycle
- Control Word
- Error Indication Bits
- Communication Parameters

4.1 Gateway Modes

Gateway has two modes of operation: Master-Master and Master-Slave. Before explaining these modes further Master and Slave concept should be explained.

Master:
Master is a Device / device driver which initiates communication.

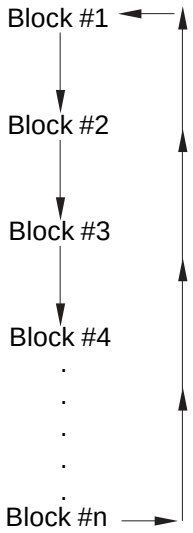
Slave:
Slave is Device / Device driver which processes Master's query, takes necessary action and responds to the query, if necessary.

4.1.1 Master-Master Configuration

In this mode both Gateway ports are master in nature and devices connected on these ports are slave. Gateway ports initiate communication when the proper Gateway-Device communication cable is attached. Data is transferred in blocks. This transfer can either be a continuous process or as per requirement. A control word (Section 4.3), present in device on either side, enabled from Gateway Setup Software, can control the block execution.

When control word is disabled, then block transfer is a continuous process. A block of data is fetched from one device and transferred to the other device. The amount of data to be transferred (Number of words) depends on Block definition in "Block Definition Area" in Configuration Software. One block is executed at a time. A cycle consists of execution of blocks from #1 to #n.

Execution of blocks is performed as follows,



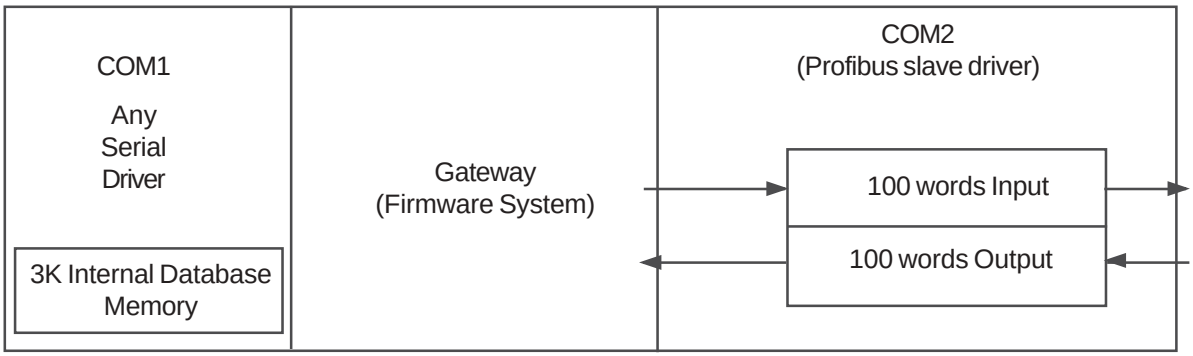
When Control word is enabled, it decides which block has to be executed by writing a specific data in the control word.

Note on Gateway Profibus drivers:

Gateway Profibus driver uses 200 words of internal memory (100 words for input and 100 words for output) as per profibus specification.

This memory is divided into two parts, Input Area and Outptut Area. The first word of Input area is I000 and the first word of Output area is O000. Pofibus master writes data in Output Area and reads the data from Input Area. With Gateway project it is possible for serial devices to read the data from Output Area and also they can write the data in Input Area.

This memory is shared memory for Profibus master devices and Gateway firmware system as shown bellow.

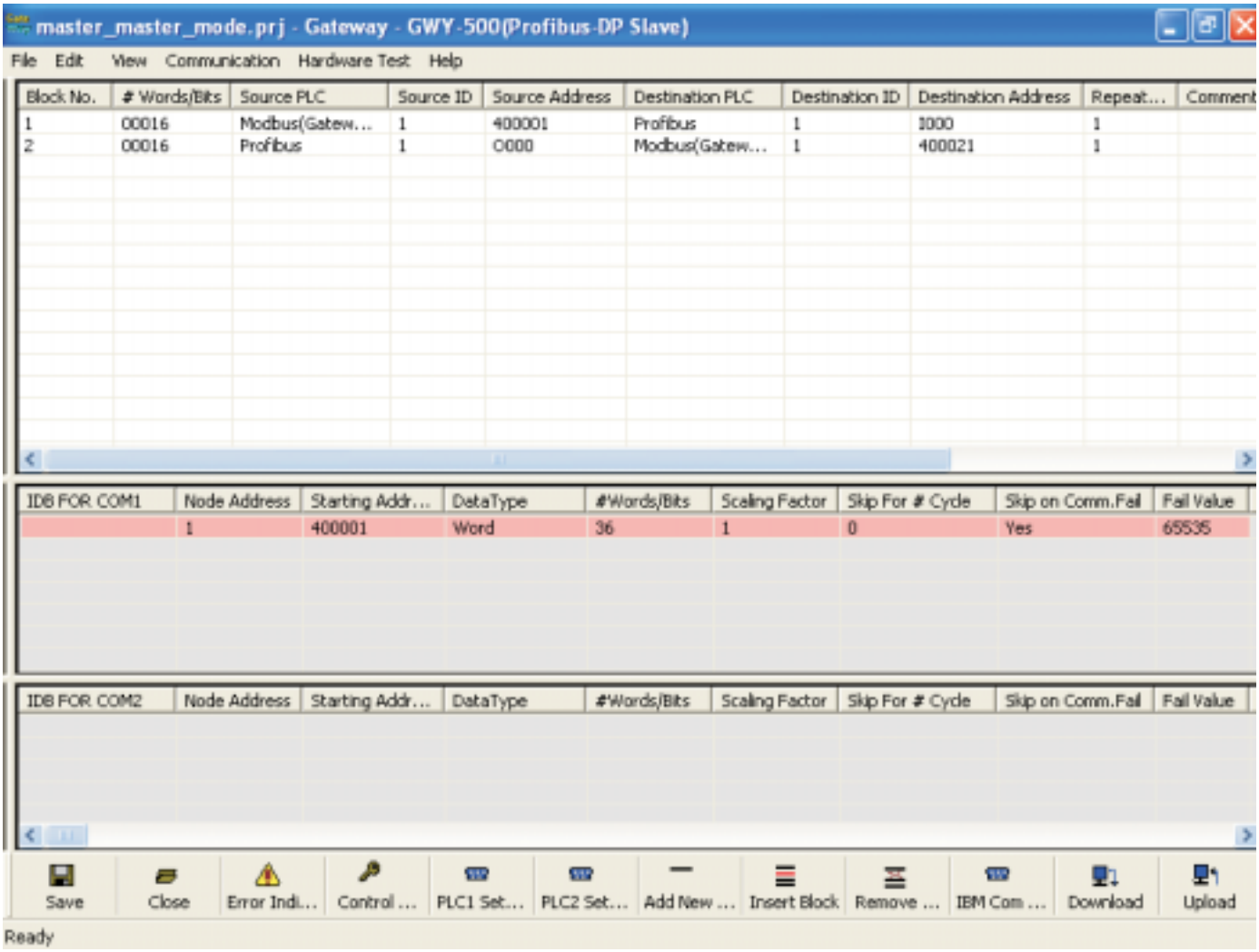


Gateway firmware system and external profibus master <u>both act as a master on this memory</u>.

Though Gateway Profibus driver is slave with respect to external profibus master device, Gateway firmware system assumes this driver as a master driver as it is master to 200 words internal memory.

Let us see the example of Master-Master mode as shown in the picture below:

Configure Gateway ports as: PLC1 Protocol: Modbus (Gateway as Master)
PLC2 Protocol: Profibus


master_master_mode.prj - Gateway - GWY-500(Profibus-DP Slave)
File Edit View Communication Hardware Test Help
Block No. # Words/Bits Source PLC Source ID Source Address Destination PLC Destination ID Destination Address Repeat... Comment
1 00016 Modbus(Gatew... 1 400001 Profibus 1 1000 1
2 00016 Profibus 1 O000 Modbus(Gatew... 1 400021 1
IDB FOR COM1 Node Address Starting Addr... DataType #Words/Bits Scaling Factor Skip For # Cycle Skip on Comm.Fail Fail Value
1 400001 Word 36 1 0 Yes 65535
IDB FOR COM2 Node Address Starting Addr... DataType #Words/Bits Scaling Factor Skip For # Cycle Skip on Comm.Fail Fail Value
Save Close Error Indi... Control ... PLC1 Set... PLC2 Set... Add New ... Insert Block Remove ... IBM Com ... Download Upload
Ready

Words defines number of registers/coils to be read / written between two devices.
Block #1: Gateway reads 16 words starting from 400001 from Modbus and write these 16 words data to internal memory of Profibus (Input area).
Block #2: Gateway reads 16 words starting from O000 in internal memory of Profibus (Output area) and writes it to holding register starting from 400020.

As this example has only two blocks, Gateway will execute Block #1 after executing Block #2 continuing *this cycle forever.*

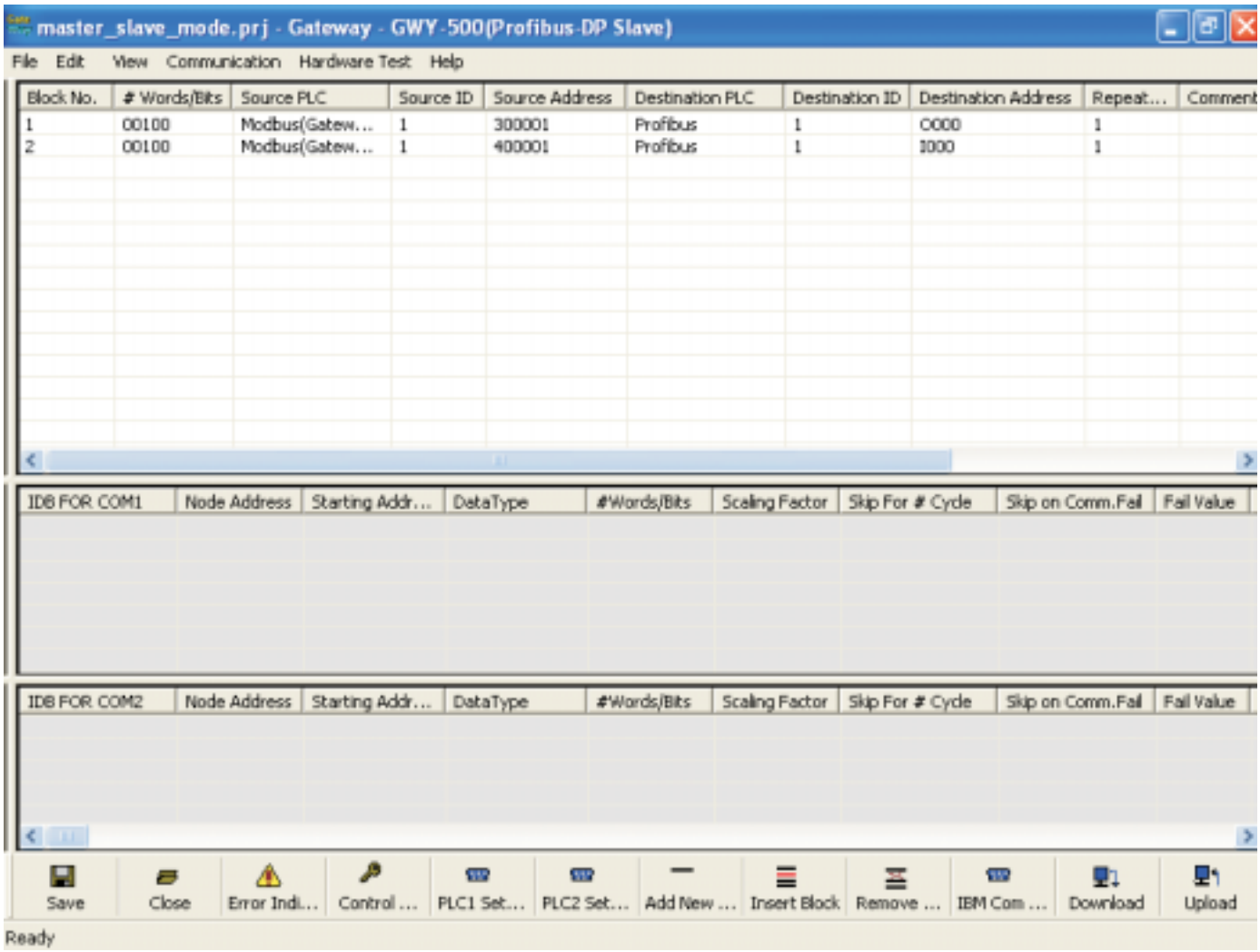
Notes:
1) Maximum 255 blocks can be configured in any mode.

4.1.2 Master-Slave Configuration

In this mode, one of the Gateway ports is a master and other is the slave so the devices connected on these ports are slave and master respectively. Blocks do not control data transfer in this mode. Data transfer takes place only when Master Device, connected on slave port of Gateway, sends a request to read / write data. This mode requires mapping registers for data transfer. Mapping means defining one or multiple registers in the Slave Device corresponding to one or multiple registers / coils in the Master Device. Mapping can be done using the Block definition area, so in this mode, any Block is used for mapping registers of the two devices.
In Block Definition area, # Words Field indicates number of registers to be mapped **linearly** from the starting addresses of the Source Device to the Destination Device. Maximum number of registers that can be mapped is 255, but this does not mean that Master Device has to read / write 255 registers in one command.
In one command Master can read / write registers from one Block only, so if multiple registers are to be read / written using a single command, # Words also limits the maximum number of registers to be read / written. Number of registers to be read /written in one command also depends on

- protocol of BOTH the devices
- Buffer capacity of Gateway.

Now let us take the example of Master-Slave mode.
Configure Gateway ports as: PLC1 Protocol - Modbus (Gateway as Slave)
PLC2 Protocol - Profibus.


master_slave_mode.prj - Gateway - GWY-500(Profibus-DP Slave)
File Edit View Communication Hardware Test Help
Block No. # Words/Bits Source PLC Source ID Source Address Destination PLC Destination ID Destination Address Repeat... Comment
1 00100 Modbus(Gatew... 1 300001 Profibus 1 0000 1
2 00100 Modbus(Gatew... 1 400001 Profibus 1 1000 1
IDB FOR COM1 Node Address Starting Addr... DataType #Words/Bits Scaling Factor Skip For # Cycle Skip on Comm.Fail Fail Value
IDB FOR COM2 Node Address Starting Addr... DataType #Words/Bits Scaling Factor Skip For # Cycle Skip on Comm.Fail Fail Value
Save
Close
Error Indi...
Control ...
PLC1 Set...
PLC2 Set...
Add New ...
Insert Block
Remove ...
IBM Com ...
Download
Upload
Ready

Block #1 maps 100 words of Modbus starting from 300001 to Profibus starting from O000.
Block #2 maps 100 words of Modbus starting from 400001 to Profibus starting from I000.

In above example, request from Modbus Master is executed as follows:
1. Modbus Master connected on serial port (COM1) sends command to Gateway for setting holding register 400001.
2. Gateway searches defined Blocks and checks whether this register is mapped to any Profibus word.
In example, holding register 400001 is mapped to I000 in Block 2. Gateway accepts this command and sets I000.

If Master sends a command to read / write a register / coil not defined in any Block then Gateway sends exception response to master.

NOTES:

1) If multiple registers are to be read or written in one command, then all the registers have to be de fined in one Block.

2) As Gateway Setup Software is common for both the Gateway Modes, titles in the Block Definition Area, may not be appropriate when using Gateway in Master - Slave mode (e.g. Source ID, Source PLC, Destination PLC).

3) Maximum 255 blocks can be configured in any mode.

4) In Master - slave mode, If somebody mapped read only registers at destination end to any registers at source end, it's users responsibility that these registers are not going to be written by master.

4.2 Repeat Cycle

User can control Block execution by using the Repeat Cycle field. This number decides whether the Block will be executed in each cycle. Larger the number lower the priority of the Block. Range for Repeat Cycle setting is 1-99.
Repeat Cycle = 1 ……. Highest priority
Repeat Cycle =99 …….Lowest priority

Repeat cycle is important when using Gateway in Master - Master mode. **If Gateway is used in Master - Slave mode, Repeat Cycle field should be kept as '1'.**

Repeat cycle defines the number of times a Block will be skipped while executing Blocks in a sequential manner. Block will not be executed for [Repeat Cycle - 1] cycles. So if Repeat Cycle for a Block is 1, it will be executed in each cycle whereas if Repeat Cycle is 2, then this Block will NOT be executed in alternate cycles.

For example, suppose Blocks are defined with following Repeat Cycles:

Block #1	Repeat Cycle = 1
Block #2	Repeat Cycle = 2
Block #3	Repeat Cycle = 3
Block #4	Repeat Cycle = 4

After power up, Cycles will be executed as follows:
Cycle 1:
Block #1
Block #2
Block #3
Block #4
Cycle 2:
Block #1
Cycle 3:
Block #1
Block #2
Cycle 4:
Block #1
Block #3
Cycle 5:
Block #1
Block #2
Block #4

4.3 Control Word

Another way of controlling Block execution is by use of the Control Words. 16 control words i.e. 255 control bits are available by which user can control 255 blocks. O^{th} Control bit corresponds O^{th} bit of control word 1, .., 16^{st} Control bit corresponds 0^{st} bit of control word 2,.. , 255^{th} Control bit corresponds 15^{th} bit of control word 16. By default 0 to 255 control bits are mapped to 1 to 256 blocks. User can change value of the control bit. Control Word can be enabled or disabled in Gateway Configuration. Normally Control Word is disabled for a New project. It can be enabled just by clicking on check box in the setup software. Control Word can be chosen from any of the Devices connected.
If the Control Word field is enabled, for the control bit choosen in the project block, accordingly the number of words in the control field should be taken.
For example, if 36^{th} Control bit is choosen to control the block then number of words in the Control Word field should be 3.
Number of control bits / 16 = Number of control words.
If Number of control bits % 16 != 0 (Non-zero so add 1 in the number of words in the control field) then Number of control words = Number of control words + 1

In the above example, number of control bits are 36.
So 36 / 16 = 2 (Number of words in control field)
36%16 = 4 (i.e. Non-zero so add 1 in the number of words in the control field), so number of words in control field are 2+1 = 3. So number of words in the control field should be choosen as 3. For any block any control bit can be choosen.

Control Word can only be used in Master-Master mode since no continuous data transfer takes place in Master -Slave mode (data transfer only takes place on Master's request)

When the Control Word is disabled, Block execution is totally controlled by Repeat Cycle settings. When the Control Word is enabled, Block execution is controlled using discrete bits of that word.

Bit 0 in control word controls execution of Block #1
Bit 1 in control word controls execution of Block #2
:
Bit 15 in control word controls execution of Block #16

When a bit is high, '1', corresponding Block is executed depending on its Repeat Cycle. When a bit is low, '0', execution of corresponding Block is disabled.

4.4 Error Indication Bit

This feature enables detection of communication breaks during error free communication between Gateway and two devices. Communication breaks can occur due to no cable connection, wire faults, device power failure at both ends of Gateway. An Error bit can be designated in each external device connected to
Gateway. Using this bit, fault at the PLC1 end can be reported to PLC2 Device and fault at PLC2 end can be reported to PLC1 Device. When communication error occurs on PLC1, Gateway sets error bit in PLC2 device. *Error Indication Bit can only be used in Master-Master mode. In Master-Slave mode any error can easily be detected by a communication time out on the Master.*

Error indication bit can be enabled using Gateway configuration software. Normally Error bit is disabled for a New project. It can be enabled just by clicking on the check box in the setup software. Error indication bit can be enabled in both or any one of the Devices connected to Gateway. Error Indication bit is "OFF" to indicate error free communication. In case of communication error on PLC2, Gateway sets error bit on PLC1 port and vice versa.

4.5 Communication Parameters

Communication Parameters of Gateway can be set from configuration Software. This enables Gateway to readily communicate with any device. Communication parameters for PLC1 and PLC2 ports can be configured independently. This feature allows changes in Baud rate, Number. of stop bits, Parity etc. at any time without downloading the driver for that particular device. After the driver for a particular device is downloaded, the communication parameters can be changed simply by selecting new communication parameters and downloading the same project.

NOTE ON COMMUNICATION DRIVERS

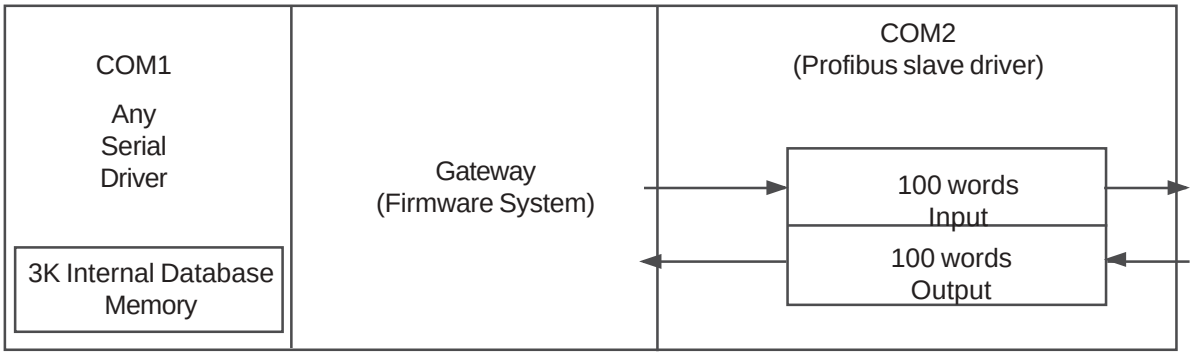
5.1 Note On Communication Drivers

How Gateway Profibus Slave driver works?

Gateway Profibus driver uses 200 words of internal memory (100 words for input and 100 words for output) as per profibus specification.

This memory is divided into two parts, Input Area and Outptut Area. The first word of Input area is I000 and the first word of Output area is O000. Pofibus master writes data in Output Area and reads the data from Input Area. With Gateway project it is possible for serial devices to read the data from Output Area and also they can write the data in Input Area.
I000 is Input to Profibus Master.
O000 is Output from Profibus Master.

This memory is shared memory for Profibus master devices and Gateway firmware system as shown bellow.



Gateway firmware system and external profibus master <u>both act as a master on this memory</u>.

Though Gateway Profibus driver is slave with respect to external profibus master device, Gateway firmware system assumes this driver as a master driver as it is master to 200 words internal memory.

Note: Profibus detects baud rate automatically. So baud rate feild in PLC2 Settings of Gateway software does not have meaning specific meaning.
Source ID and Destination ID related to Profibus driver does not have specific meaning. Profibus ID is set by Gateway configuration software. (PLC2 settings/Advanced)

How other serial drivers work?

Example1: Toshiba ASD

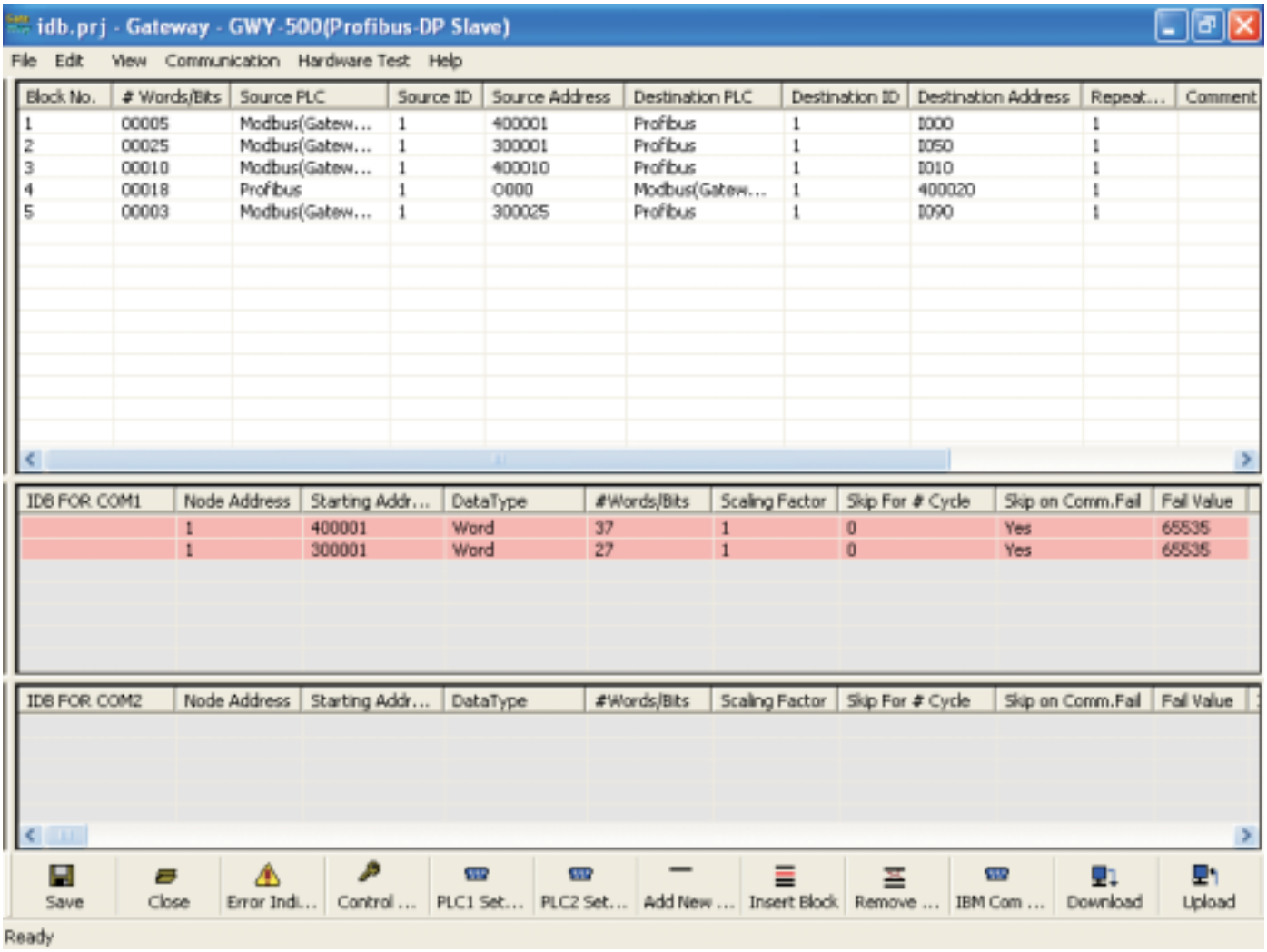
In drivers like Toshiba ASD's, single parameter is read at a time. It does not allow multiple parameters read. So in case of Toshiba ASD's driver concept of Internal Database* is not used.

Example2: Toshiba PLC

Since drivers like Toshiba PLC, Modbus allow multiple register reading in one block, in this case concept of Internal Database* is used.

* Note: Concept of Internal database (IDB) is explained on next page.

Let us have a glance at Internal database.
Please refer the following example.


idb.prj - Gateway - GWY-500(Profibus-DP Slave)
File Edit View Communication Hardware Test Help
Block No. # Words/Bits Source PLC Source ID Source Address Destination PLC Destination ID Destination Address Repeat... Comment
1 00005 Modbus(Gatew... 1 400001 Profibus 1 I000 1
2 00025 Modbus(Gatew... 1 300001 Profibus 1 I050 1
3 00010 Modbus(Gatew... 1 400010 Profibus 1 I010 1
4 00018 Profibus 1 O000 Modbus(Gatew... 1 400020 1
5 00003 Modbus(Gatew... 1 300025 Profibus 1 I090 1
IDB FOR COM1 Node Address Starting Addr... DataType #Words/Bits Scaling Factor Skip For # Cycle Skip on Comm.Fail Fail Value
1 400001 Word 37 1 0 Yes 65535
1 300001 Word 27 1 0 Yes 65535
IDB FOR COM2 Node Address Starting Addr... DataType #Words/Bits Scaling Factor Skip For # Cycle Skip on Comm.Fail Fail Value
Save Close Error Indi... Control ... PLC1 Set... PLC2 Set... Add New ... Insert Block Remove ... IBM Com ... Download Upload
Ready

NOTE ON COMMUNICATION DRIVERS

According to the project defined in Gateway software, the Gateway software automatically generates its own IDB, (Gateway drivers use this IDB for optomized communication.) as explained below.

1. Registers required for a project are grouped in a block of registers (calculation based optimized block) and entire block is read (By Gateway) in one cycle instead of reading individual registers.

5 words from 400001, 10 words from 400010, 18 words from 400020 are grouped in one block.
(Please refer the first block,IDB FOR COM1)

25 words from 300001, 3 words from 300025 are grouped in one block.
(Please refer second block ,IDB FOR COM1)

These blocks are uploaded/read in continuous fashion (in the background by Gateway driver) and data is stored in internal database memory. So time required for read cycle is optimized.

2. Write operations are on comparison basis.
Since all the registers data is already present in internal database memory of Gateway driver, every time before performing write operation data is compared with the internal memory data. In this way unnecessary write operations can be avoided.

The PLC2 driver uses this data whenever needed according to gateway project.

The Internal database is associated only with Master drivers. Every Master driver has its own internal database of 3KBytes. Data fetched by the master driver from external slave device is loaded into its internal memory in continuous fashion irrespective of block execution of Gateway project.

“Background communication Enable/Disable” default setting depends on PLC or Device protocol.

The speed of data transfer is improved because of Internal database since it reduces the number of block executions required by the Gateway software.

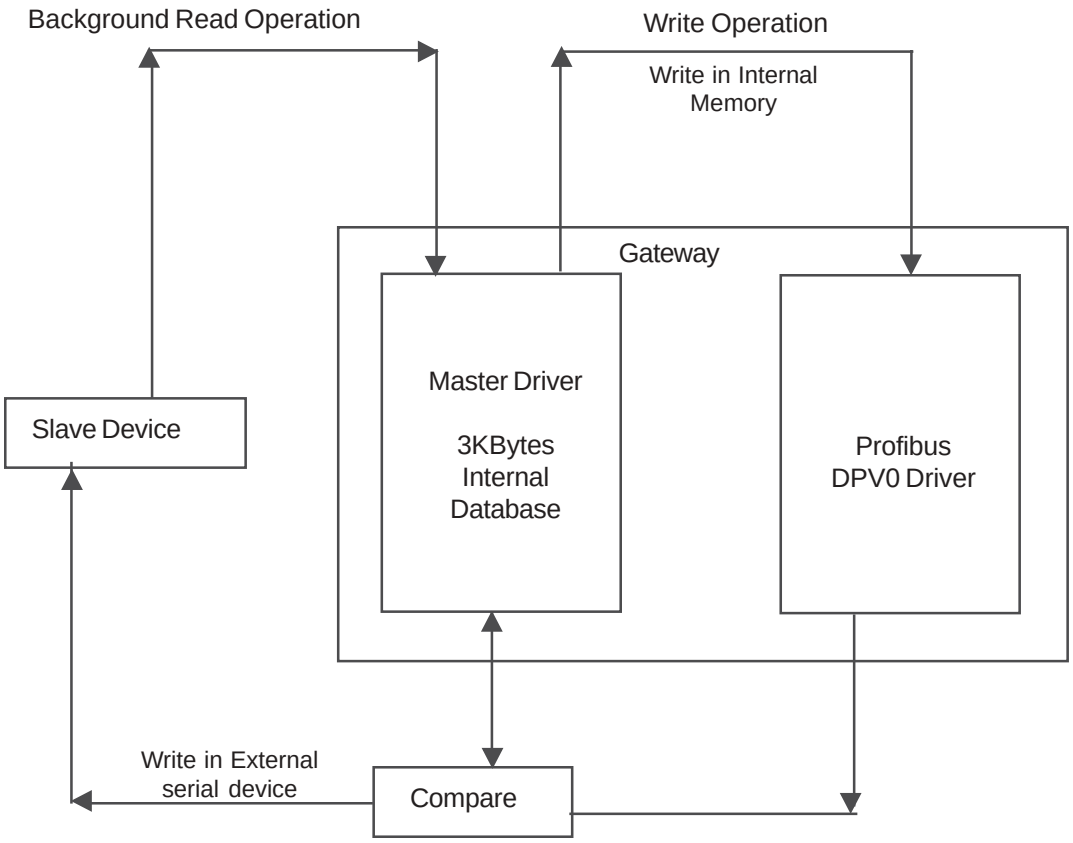


Figure 1 explains the operation of Master-Master mode with background communication.

At power on each master driver will get all inputs from their internal database Setup and according to that information starts fetching and loading data into its internal database memory irrepective of excution of project blocks.

The master driver will read all the data and load it into the intrnal database memory. But in case of write operation, each master driver will check the data available in the internal memory with the new data to be written. If the data in the internal memory is same as the new data, then Gateway software will skip the write command. In case of different data, master driver will initiate the write command.

TYPICAL PROJECTS

In this chapter. . . .

- Project Setup
- Connect Toshiba Inverter as Profibus DPV0 Slave on Profibus Network with GWY-500-B
- Connect Modicon PLC as Profibus DPV0 Slave on Profibus Network with GWY-500-B
- Connect SCADA Software on Profibus Network

6.1 Project Setup

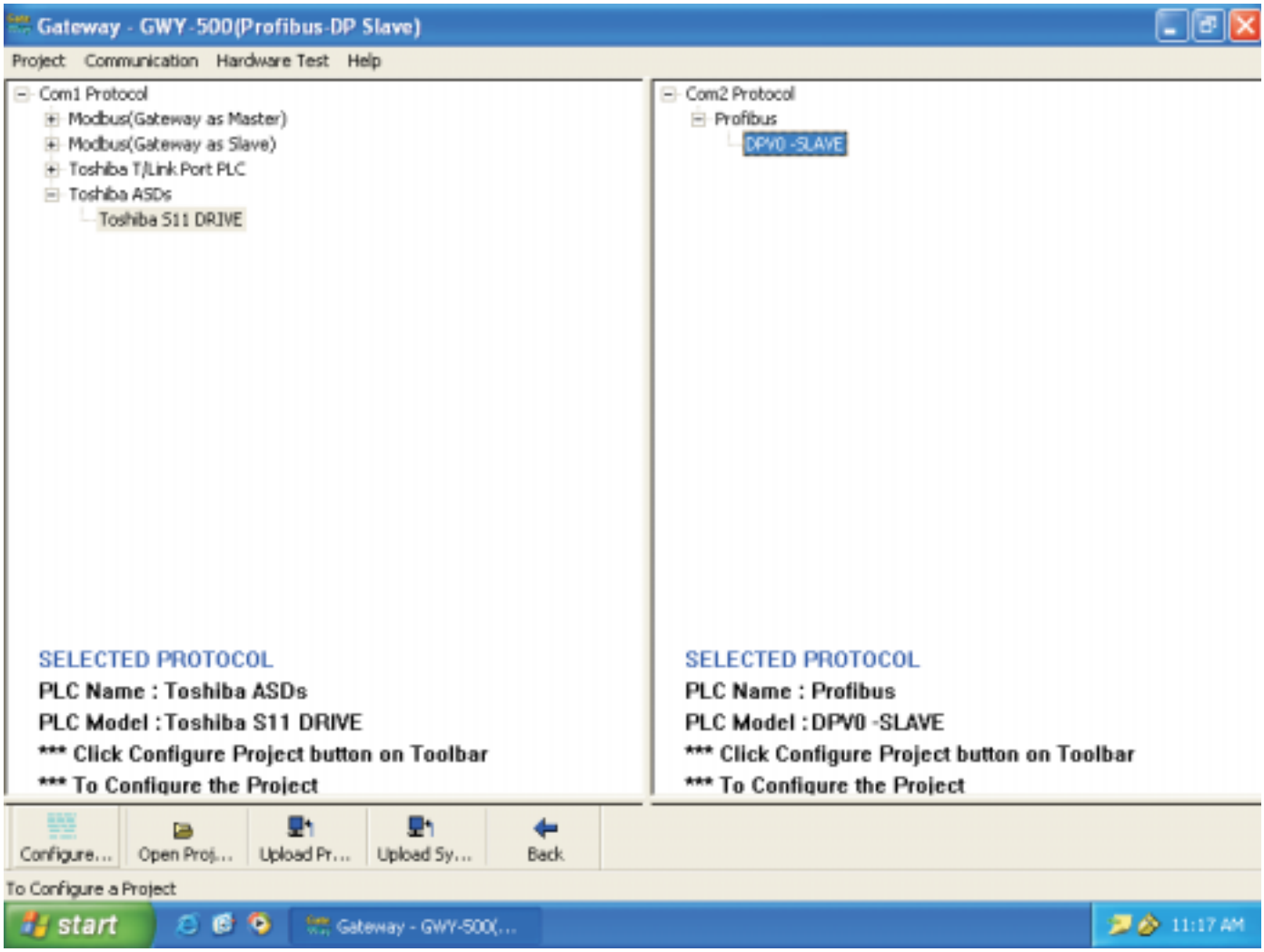
This Chapter explains, how a simple Gateway project can be created and tested. To develop a Gateway system, select appropriate Gateway model depending on the system requirements. A new project can be created as follows:

1. Define the Gateway System:
    1.1 Protocol of Device(s) connected to PLC1
    1.2 Protocol of Device(s) connected to PLC2
2. Load Microsoft Windows® based Gateway Setup software.
3. Select devices to be connected on two ports.
4. Define Blocks for data transfer.
5. Set the communication parameters for the selected devices.
6. Set conditions for block execution if required (Repeat Cycle, Control Word etc.)
7. Apply power to Gateway.
8. Download the Project and Communication Drivers into Gateway.
9. Remove Configuration Cable from PLC1 Connect Gateway - Device cable to PLC1
10. Test system.

Following Gateway examples show detailed setup for common Gateway configurations:

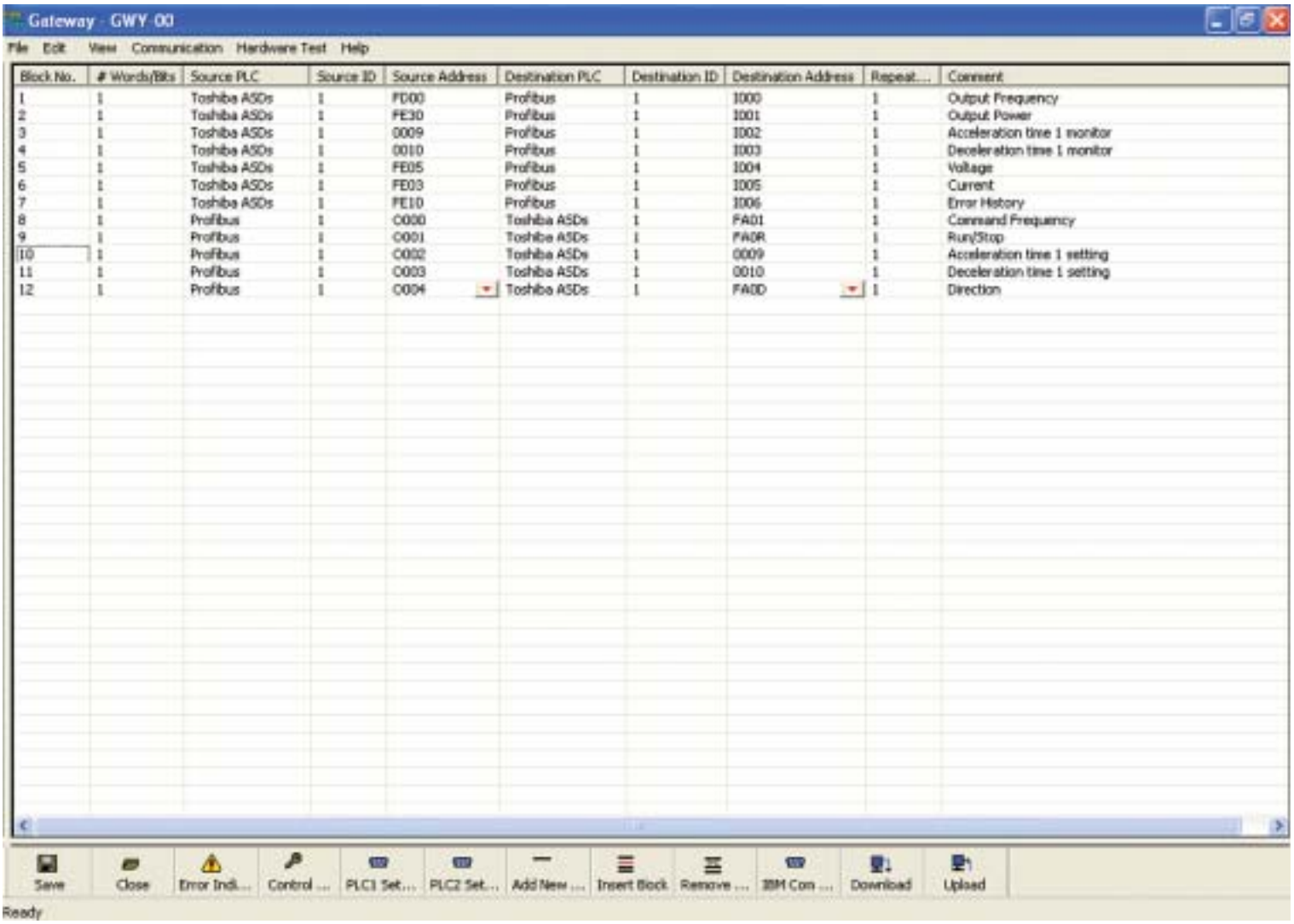
6.2 Connect Toshiba Inverter as Profibus DPV0 Slave on Profibus Network with GWY-500-B

This project reads the parameters of Inverter connected on COM1 and writes the parameters to PLC / Controller connected on COM2 and vice versa.



COM1 Protocol: Toshiba S11
COM2 Protocol: Profibus

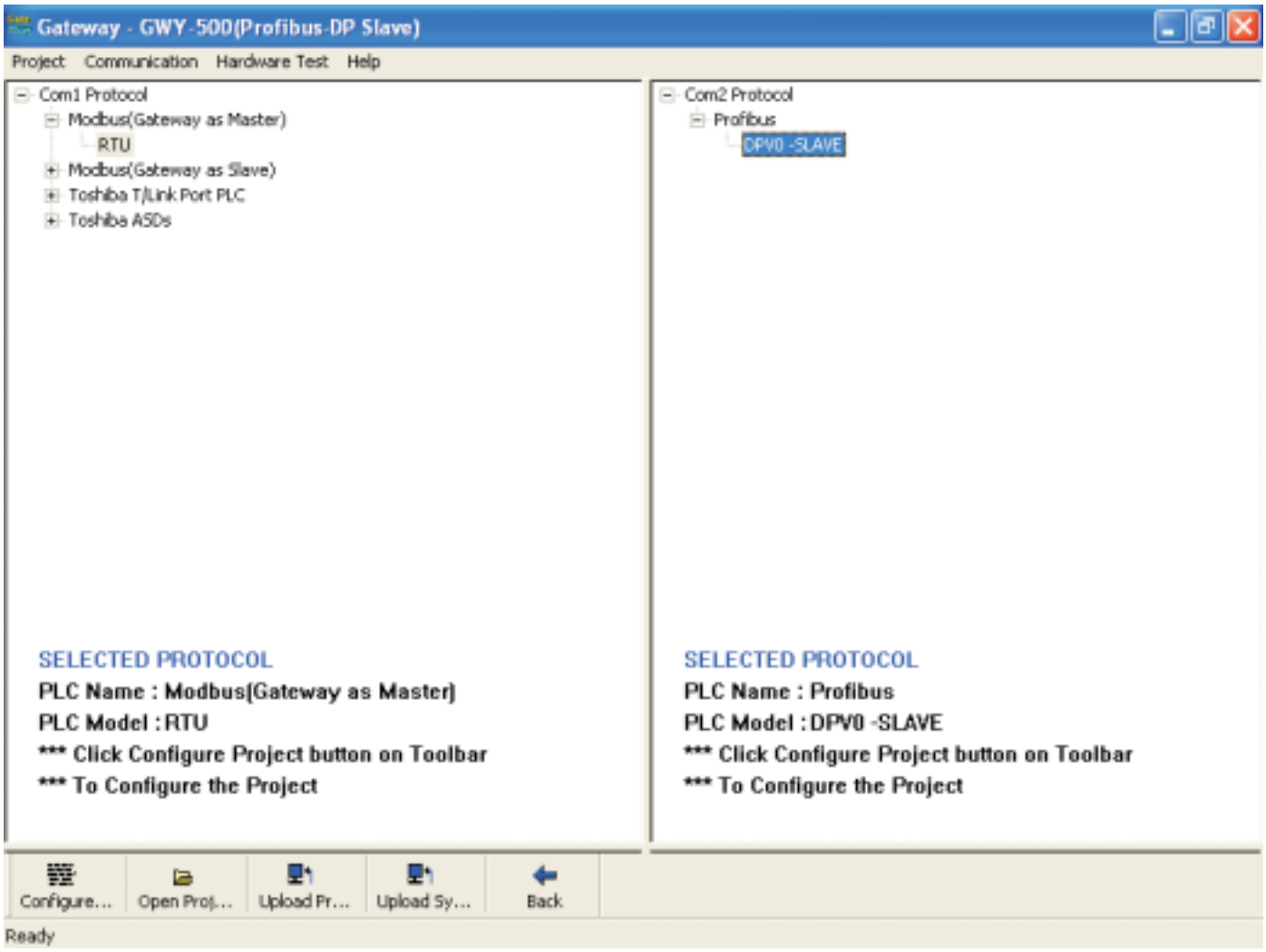
Both thses Protocols does not need IDB.


Gateway - GWY-00
File Edit View Communication Hardware Test Help
Block No. # Words/Bits Source PLC Source ID Source Address Destination PLC Destination ID Destination Address Repeat... Comment
1 1 Toshiba ASDs 1 FD00 Profibus 1 I000 1 Output Frequency
2 1 Toshiba ASDs 1 FE30 Profibus 1 I001 1 Output Power
3 1 Toshiba ASDs 1 0009 Profibus 1 I002 1 Acceleration time 1 monitor
4 1 Toshiba ASDs 1 0010 Profibus 1 I003 1 Deceleration time 1 monitor
5 1 Toshiba ASDs 1 FE05 Profibus 1 I004 1 Voltage
6 1 Toshiba ASDs 1 FE03 Profibus 1 I005 1 Current
7 1 Toshiba ASDs 1 FE10 Profibus 1 I006 1 Error History
8 1 Profibus 1 O000 Toshiba ASDs 1 FA01 1 Command Frequency
9 1 Profibus 1 O001 Toshiba ASDs 1 FA0R 1 Run/Stop
10 1 Profibus 1 O002 Toshiba ASDs 1 0009 1 Acceleration time 1 setting
11 1 Profibus 1 O003 Toshiba ASDs 1 0010 1 Deceleration time 1 setting
12 1 Profibus 1 O004 Toshiba ASDs 1 FA0D 1 Direction
Save Close Error Indi... Control ... PLC1 Set... PLC2 Set... Add New ... Insert Block Remove ... IBM Con ... Download Upload
Ready

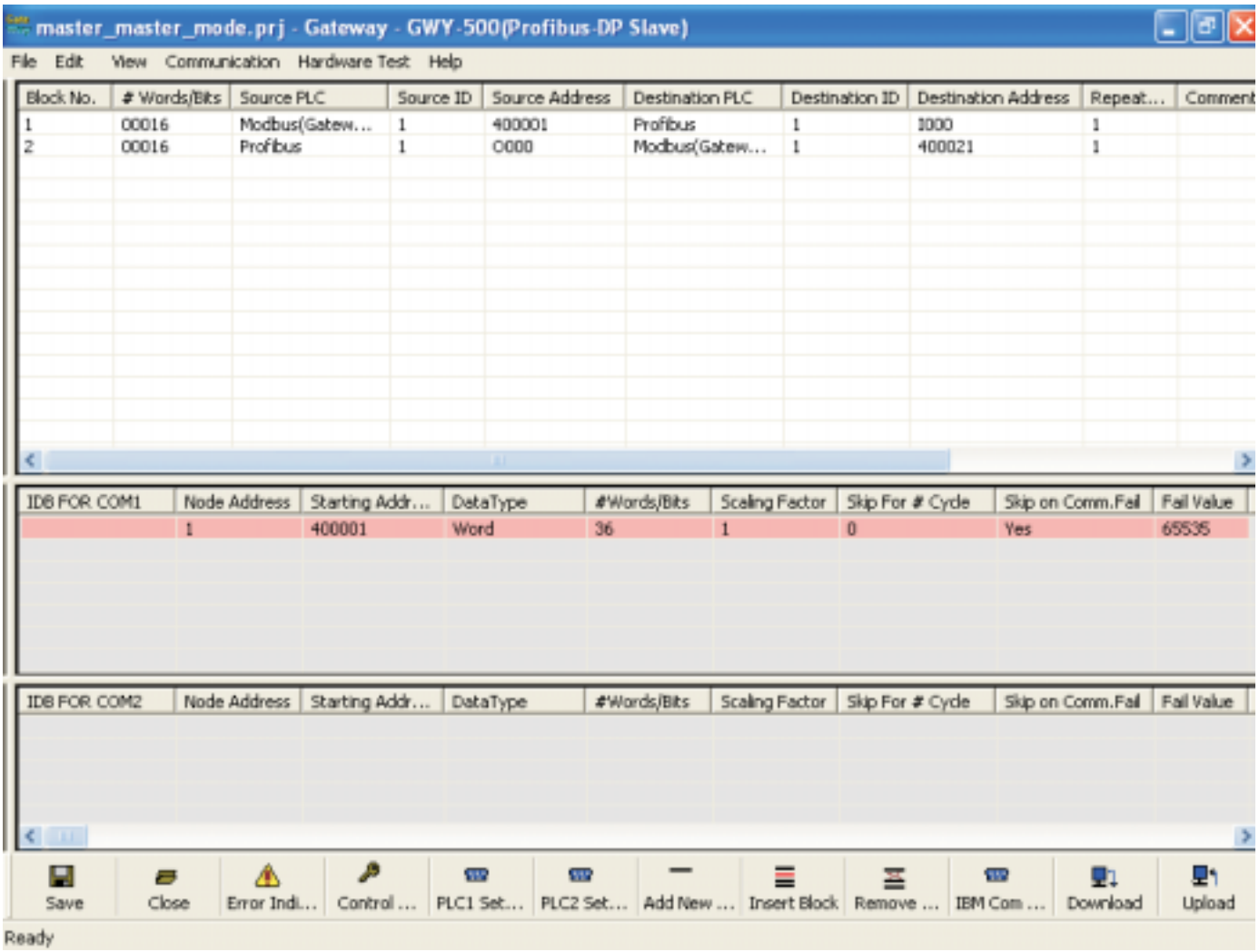
The block execution of the project is as follows:

Block#1: The current output frequency of the inverter is read and updated in I000.
Block#2: The current output power of the inverter is read and updated in I001.
Block#3: The Acceleration time1 of the inverter is read and updated in I002.
Block#4: The Decelaration time1 of the inverter is read and updated in I003.
Block#5: The output voltage of the inverter is read and updated in I004.
Block#6: The current of the inverter is read and updated in I005.
Block#7: The error history code of the inverter is read and updated in I006.
Block#8: The value of O000 is set as command frequency of the inverter.
Block#9: According to the value of O001, the inverter is Run / Stop.
Block#10: The value of O002 is set as Acceleration time1 of the inverter.
Block#11: The value of O003 is set as Decelaration time1 of the inverter.
Block#12: According to the value of O004, the direction (Forward/ Reverse) of the inverter is changed.

6.3 Connect Modicon PLC or other Modbus Slave devices as Profibus DPV0 Slave on Profibus Network with GWY-500-B



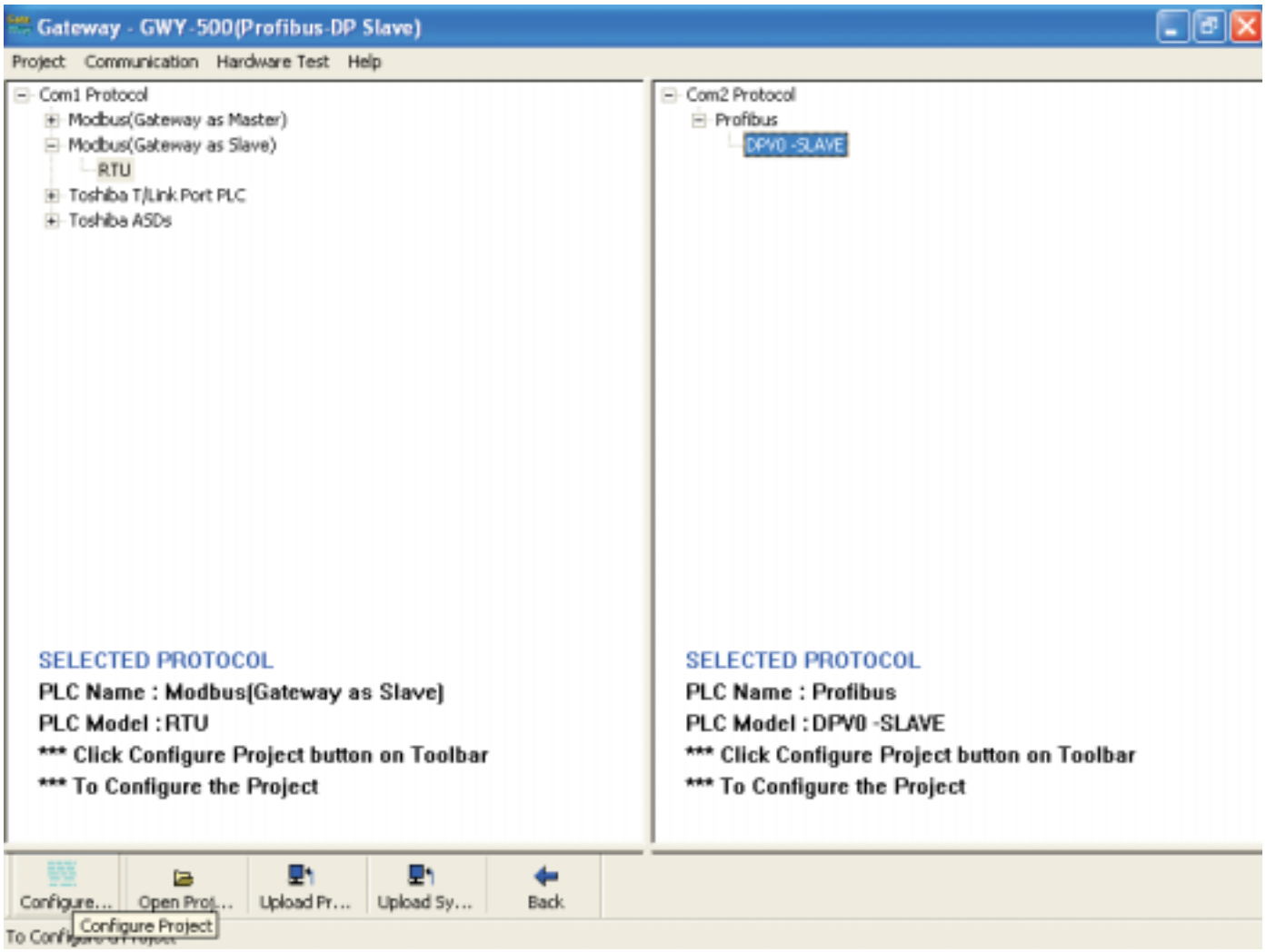
COM1 Protocol: Modbus Master
COM2 Protocol: Profibus DPV0 Slave


master_master_mode.prj - Gateway - GWY-500(Profibus-DP Slave)
File Edit View Communication Hardware Test Help
Block No. # Words/Bits Source PLC Source ID Source Address Destination PLC Destination ID Destination Address Repeat... Comment
1 00016 Modbus(Gatew... 1 400001 Profibus 1 1000 1
2 00016 Profibus 1 O000 Modbus(Gatew... 1 400021 1
IDB FOR COM1 Node Address Starting Addr... DataType #Words/Bits Scaling Factor Skip For # Cycle Skip on Comm.Fail Fail Value
1 400001 Word 36 1 0 Yes 65535
IDB FOR COM2 Node Address Starting Addr... DataType #Words/Bits Scaling Factor Skip For # Cycle Skip on Comm.Fail Fail Value
Save Close Error Indi... Control ... PLC1 Set... PLC2 Set... Add New ... Insert Block Remove ... IBM Com ... Download Upload
Ready

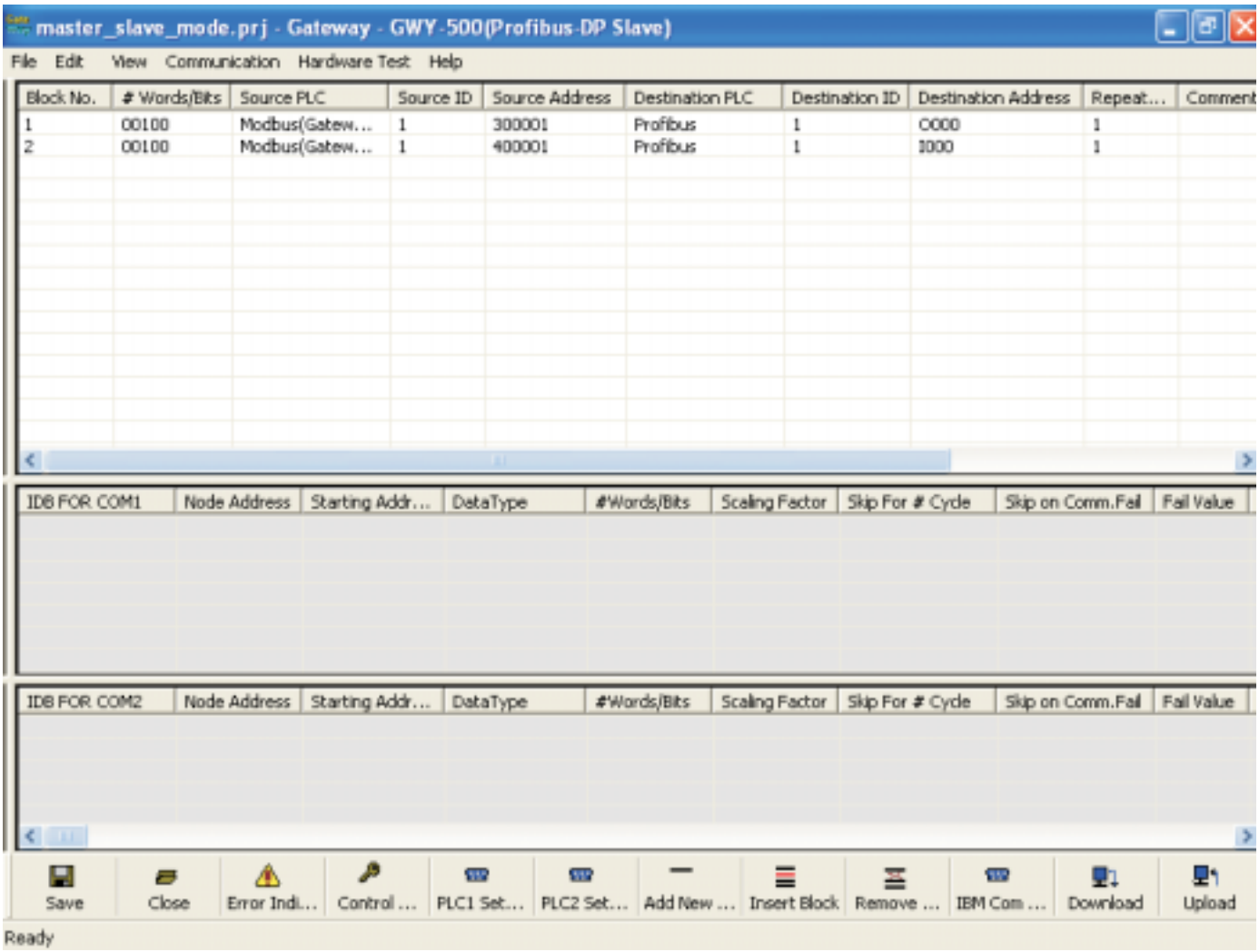
The block execution of the project is as follows:

Block #1: Gateway reads 16 words starting from 400001 from Modbus and write these 16 words data to internal memory of Profibus (Input area).
Block #2: Gateway reads 16 words starting from O000 in internal memory of Profibus (Output area) and writes it to holding register starting from 400020.

6.4 Connect SCADA Software on Profibus Network



COM1 Protocol: Modbus Slave
COM2 Protocol: Profibus DPV0 Slave


master_slave_mode.prj - Gateway - GWY-500(Profibus-DP Slave)
File Edit View Communication Hardware Test Help
Block No. # Words/Bits Source PLC Source ID Source Address Destination PLC Destination ID Destination Address Repeat... Comment
1 00100 Modbus(Gatew... 1 300001 Profibus 1 O000 1
2 00100 Modbus(Gatew... 1 400001 Profibus 1 I000 1
IDB FOR COM1 Node Address Starting Addr... DataType #Words/Bits Scaling Factor Skip For # Cycle Skip on Comm.Fail Fail Value
IDB FOR COM2 Node Address Starting Addr... DataType #Words/Bits Scaling Factor Skip For # Cycle Skip on Comm.Fail Fail Value
Save Close Error Indi... Control ... PLC1 Set... PLC2 Set... Add New ... Insert Block Remove ... IBM Com ... Download Upload
Ready

Connect SCADA device on Port1. With the help of GWY-500-B SCADA device can act as Profibus DP Slave on Profibus Network.

Block #1 maps 100 words of Modbus starting from 300001 to Profibus starting from O000.
Block #2 maps 100 words of Modbus starting from 400001 to Profibus starting from I000.

Note: I000 is the first word of Input Area in Internal Memory of Profibus driver.
O000 is the first word of Output Area in Internal Memory of Profibus driver.

CONFIGURATION SOFTWARE

In this chapter...

- System Requirements
- Installation Instruction

7.1 System Requirements

Gateway Setup software runs on a PC/AT compatible computer with the following specifications:

Windows Version	: Microsoft Windows 9x / 2000
Processor	: PENTIUM or higher
Hard disk Space	: 5 MB or more
Serial Mouse	: Required
RAM	:16 MB or more
Display resolution	: 800 X 600 (VGA) or better
Display colors	:16 bit color

7.2 Installation Instruction

Use the following procedure to install the Microsoft Windows® based Gateway setup software This installation shows the procedure to install the software from a CD Disk on drive E. On machines with different drive configurations, change the names as needed. It is recommended that a backup disk of the Gateway setup software disk be created and stored in a safe place.

1. Launch the Windows operating system.
2. Insert the setup CD into CD-drive.
3. Point to the start button then click RUN
4. In the command line box enter E:\Disk1\setup.exe. Click OK. This will launch the Gateway installer.
5. Follow the instructions to complete setup.

Gateway Project:
Each Gateway must be configured before connecting it to the PLC. Gateway configuration software allows the following:

1. Create a new Gateway project
   - Select protocols for both communication ports of gateway.
   - Create blocks for data to be shared.
   - Set Communication Parameters for both the ports.
   - Set Control Word. (Optional)
   - Set Error Indication Bit, etc. (Optional)
2. Downloading.
   - Download Project
   - Download drivers
   - Download new firmware, if required (only for upgrading).

3. Upload Project.
   The existing project in the gateway module can be viewed/edited.
4. Upload System Data.
   This option enables viewing of version number, status of firmware, drivers used, and boot block.

PROFIBUS MASTER SETUP

In this chapter. . . .

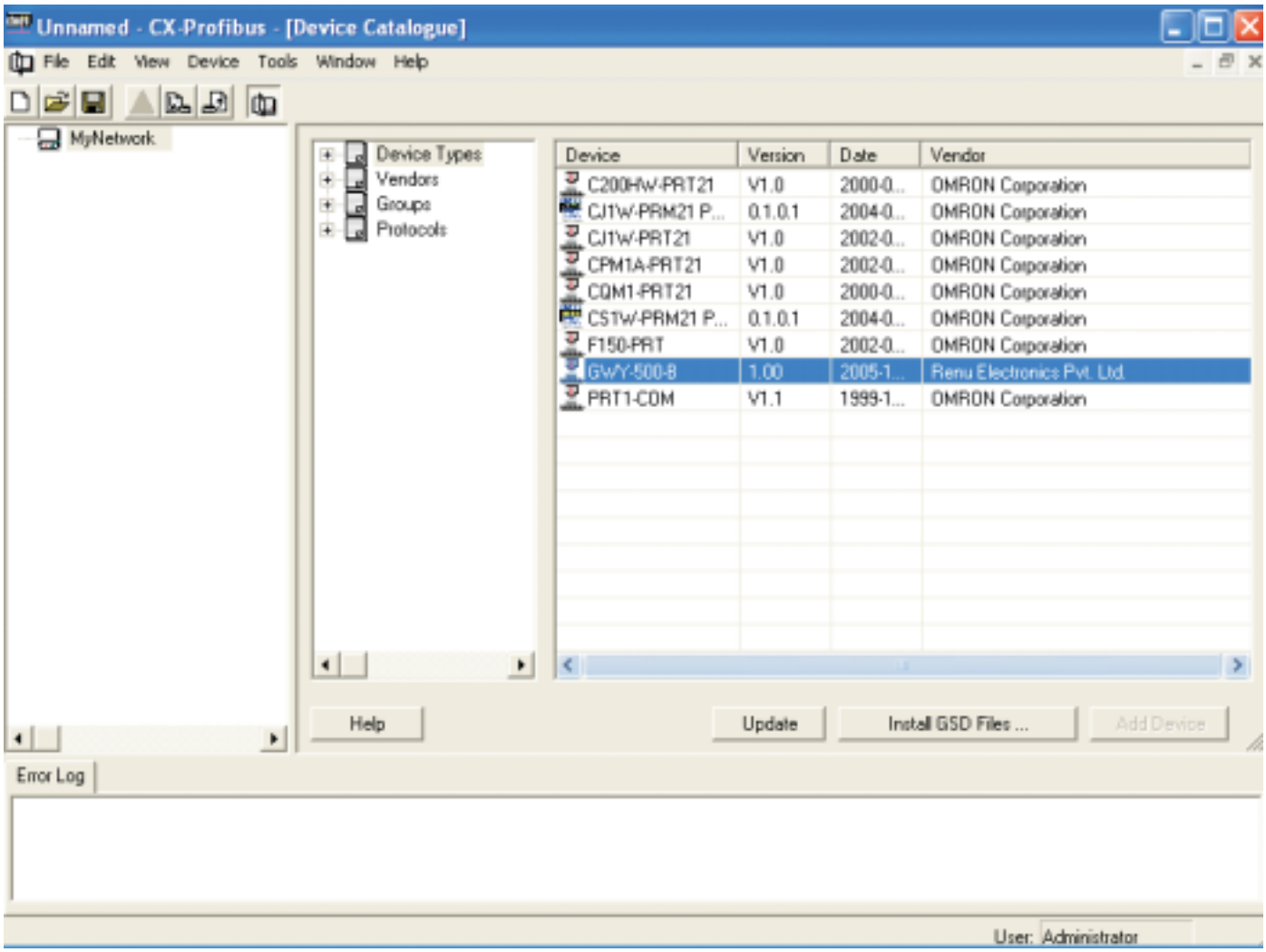
- Setup of GWY-500-B withOmron Profibus master
- Setup of GWY-500-B withSiemens Profibus master

8.1 Setup Of GWY-500-B with Omron Profibus Master

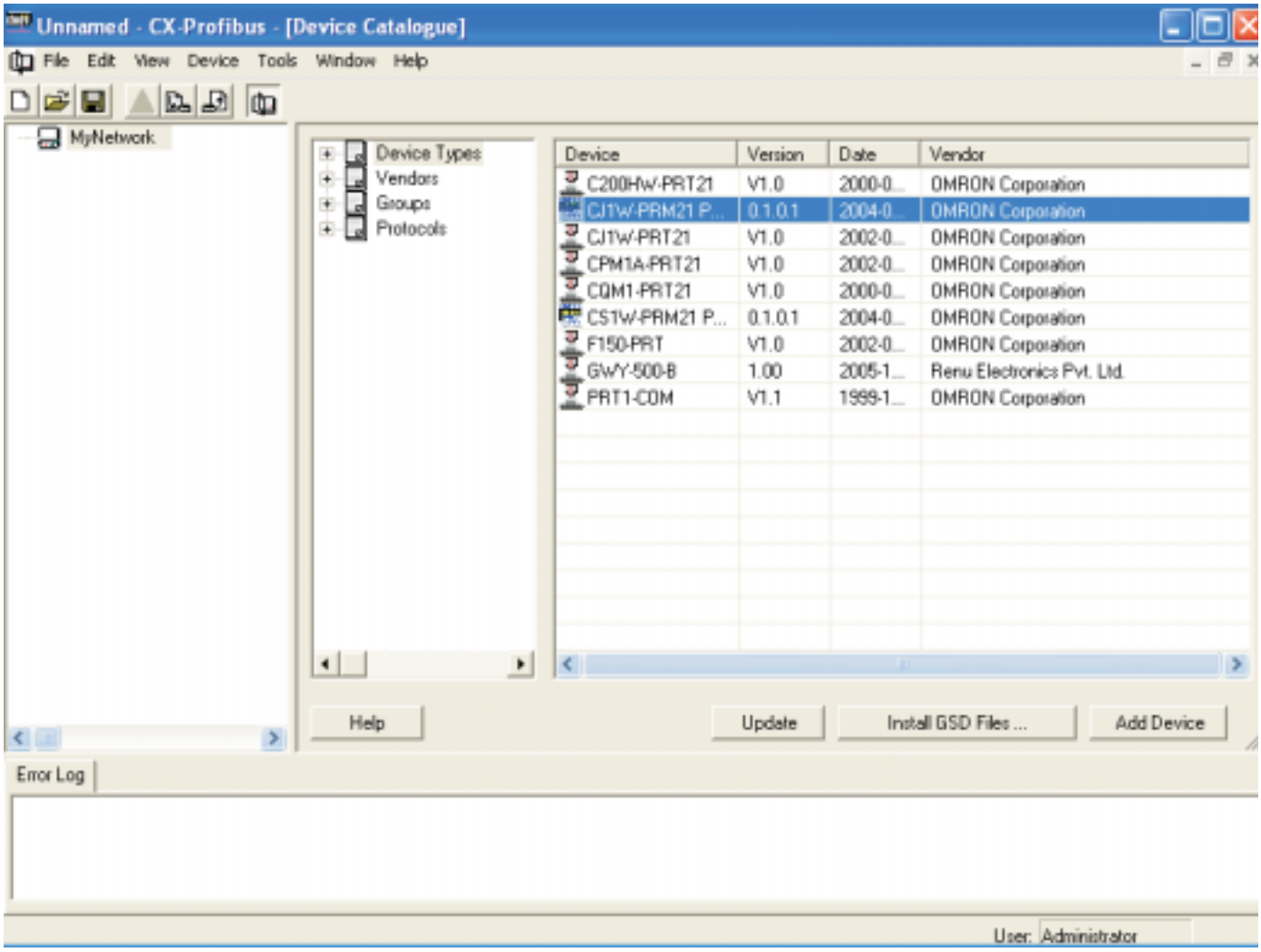
For Profibus communication, user needs the software Cx-Profibus. You need to enter the password as “password” (default), you can also change that.

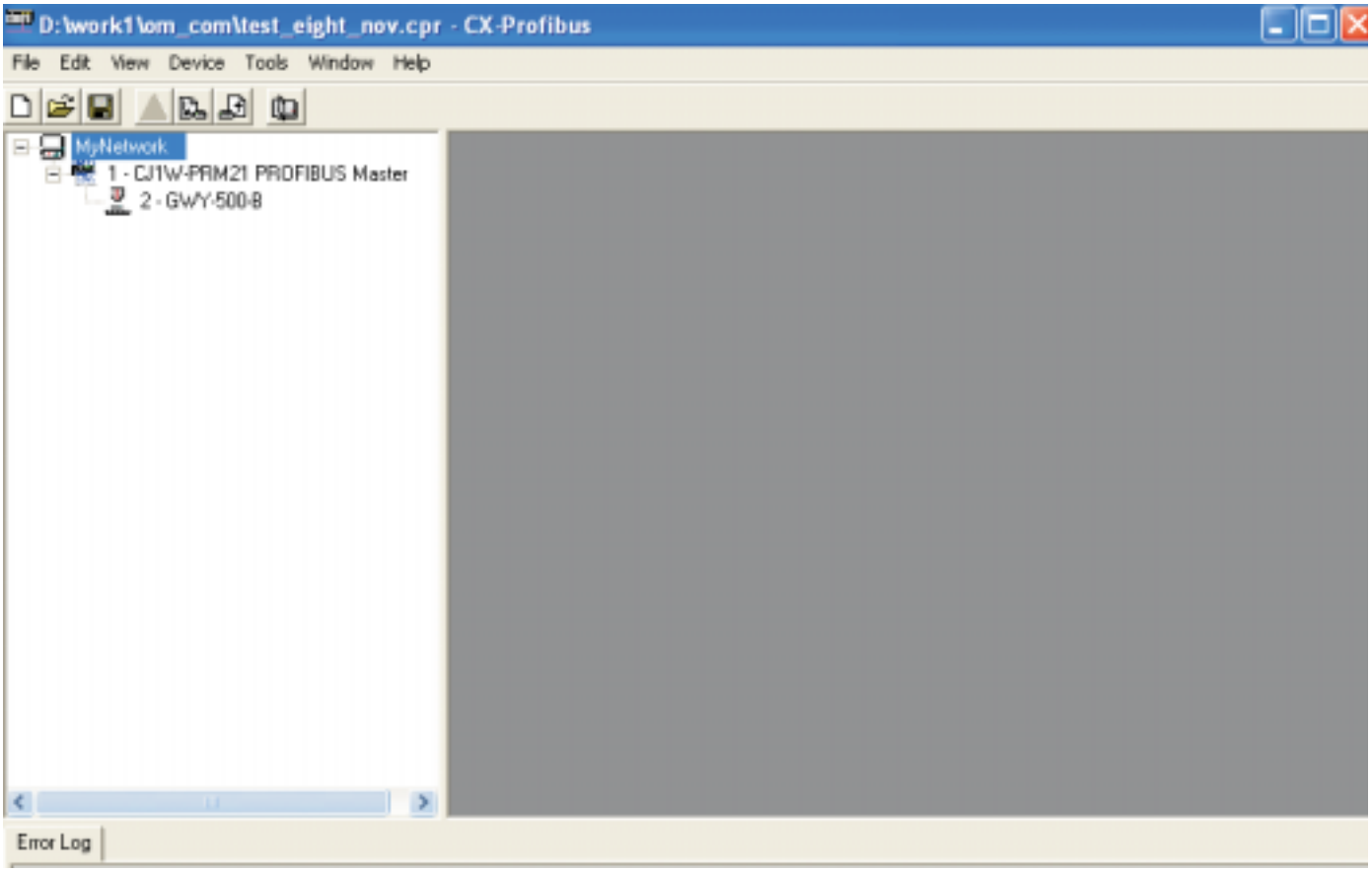
The steps for configuration of Profibus network are as follows

1 First install the GSD file for Profibus slave module.
View – Device Catalogue – Install GSD file

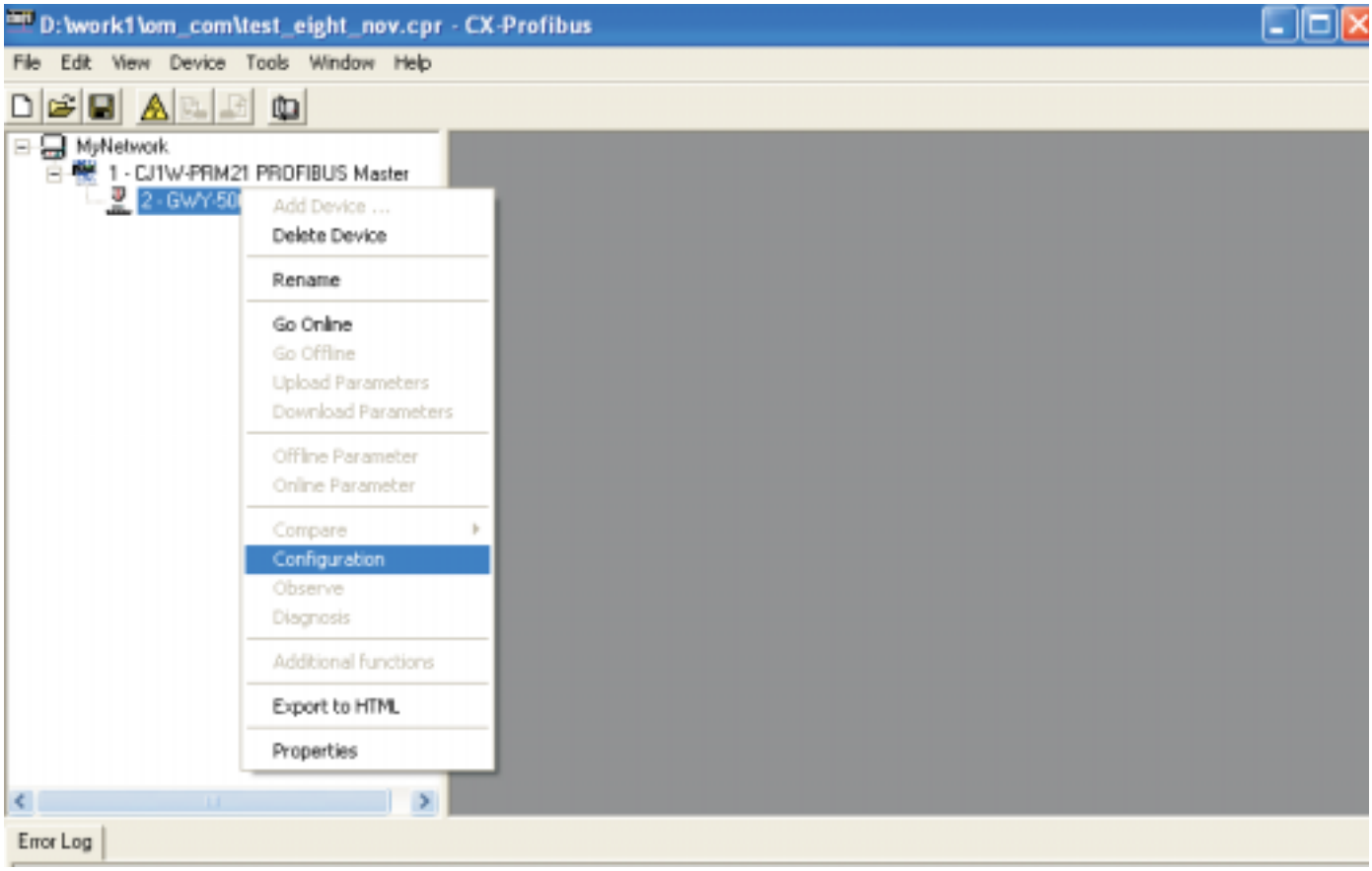


2 Then user should form the network that consists of master and slave module.
Select the module - Add Device to the network

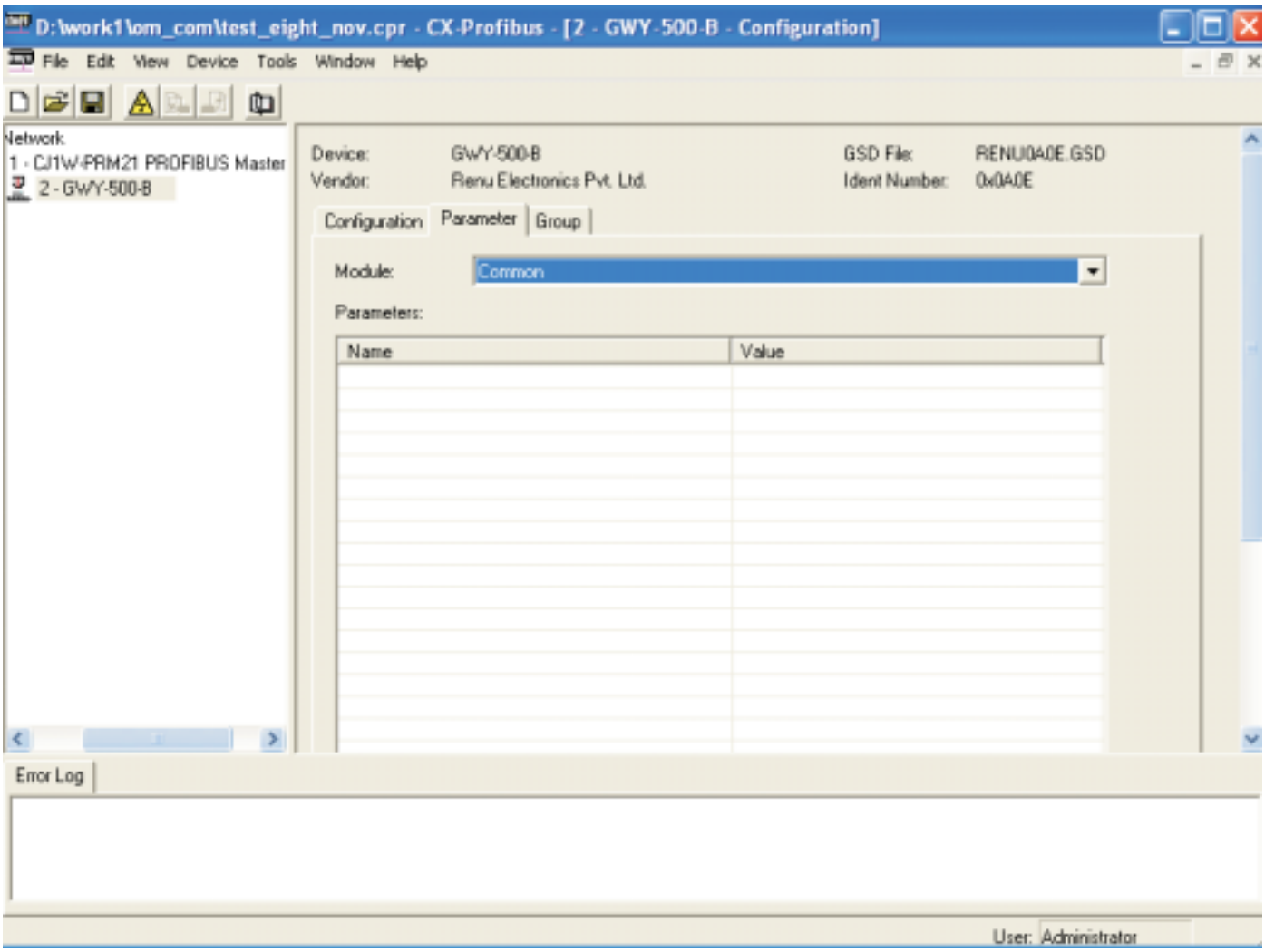



D:\work1\om_com\test_eight_nov.cpr - CX-Profibus
File Edit View Device Tools Window Help
MyNetwork
1 - CJ1W-PRM21 PROFIBUS Master
2 - GWY-500-B
Error Log

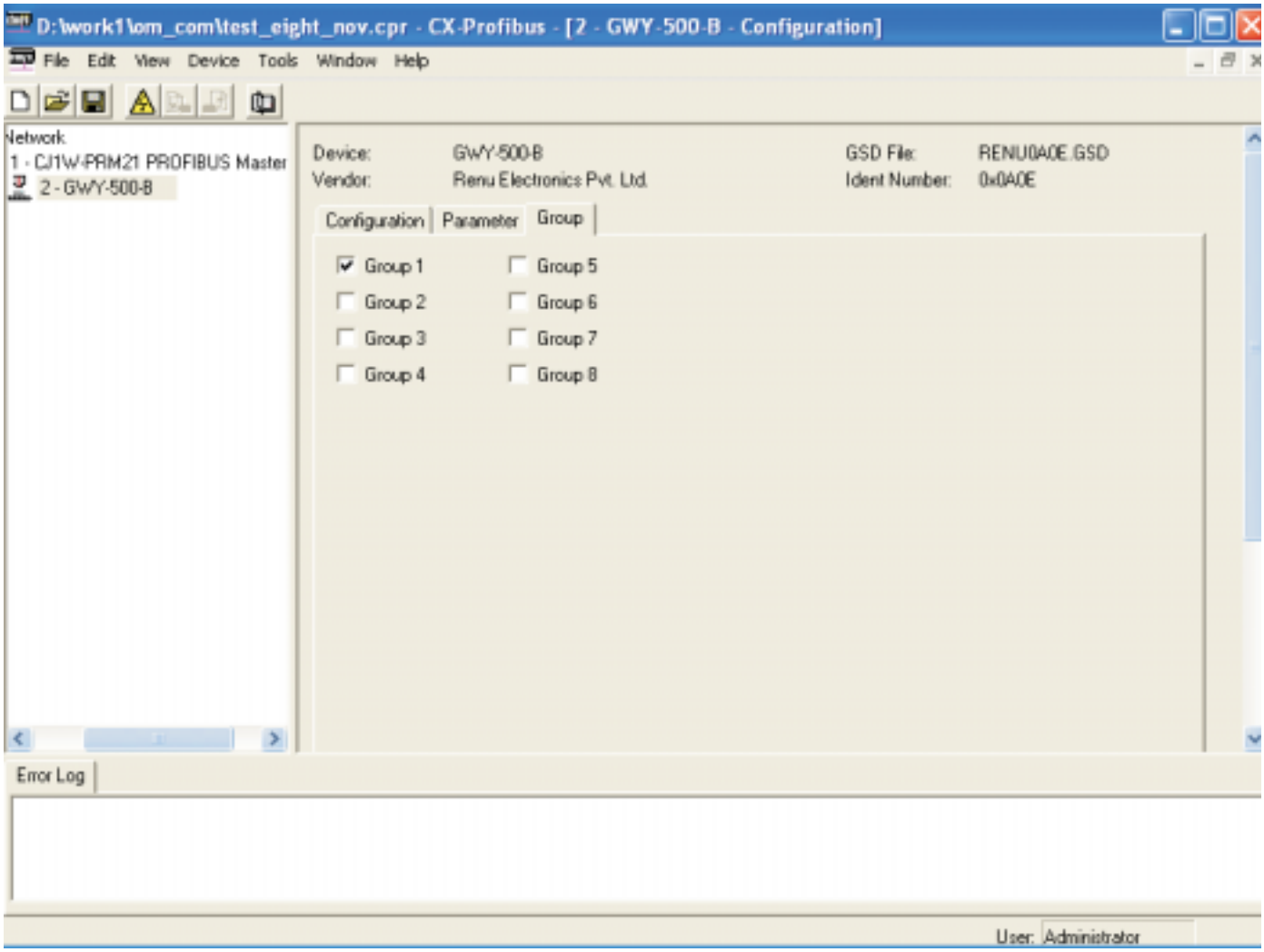
3 Profibus slave module is configured as follows.
(a) In Configuration tab, configure the Input and Output modules.

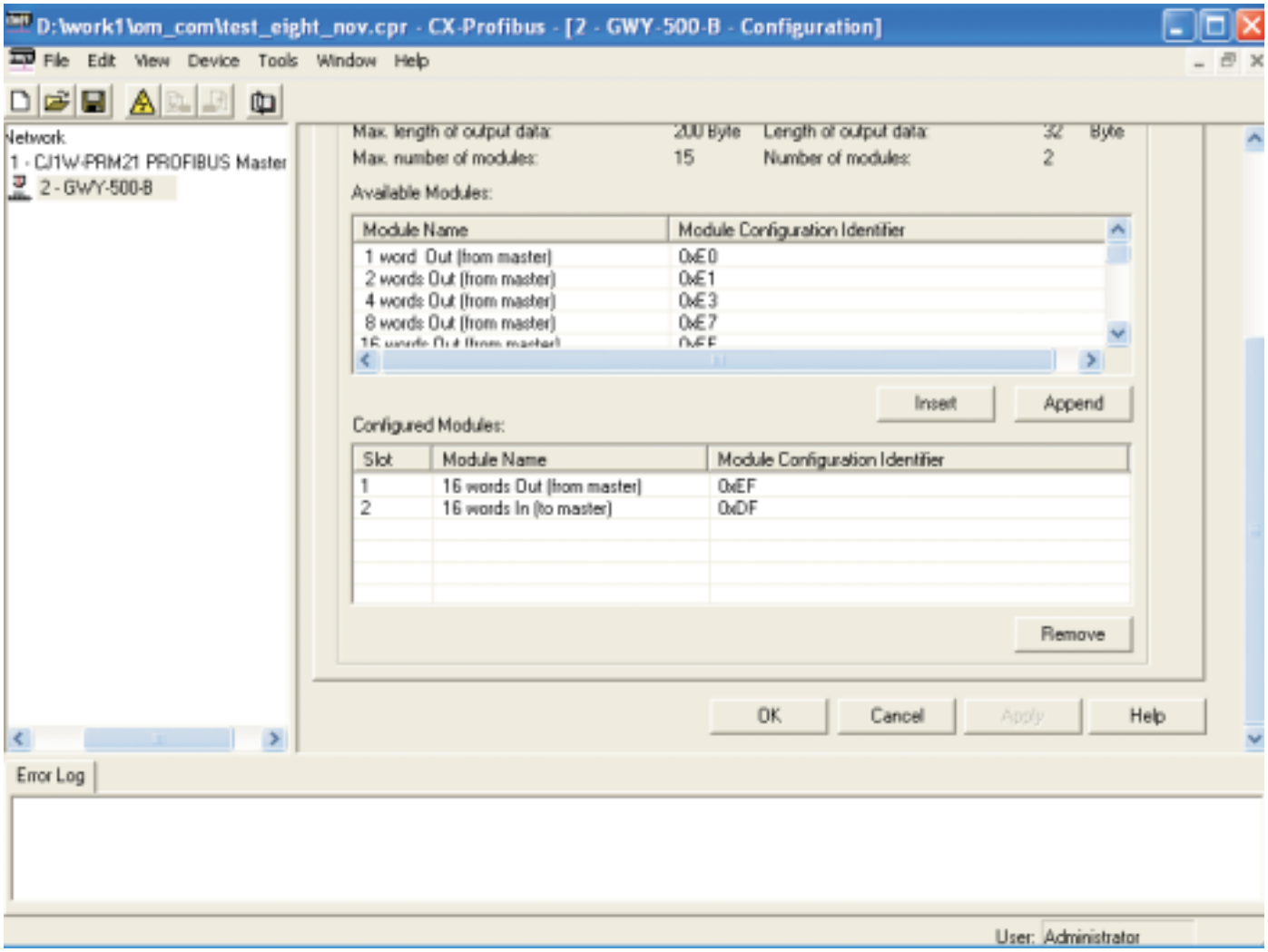


(b) In Parameter tab, keep it to common.

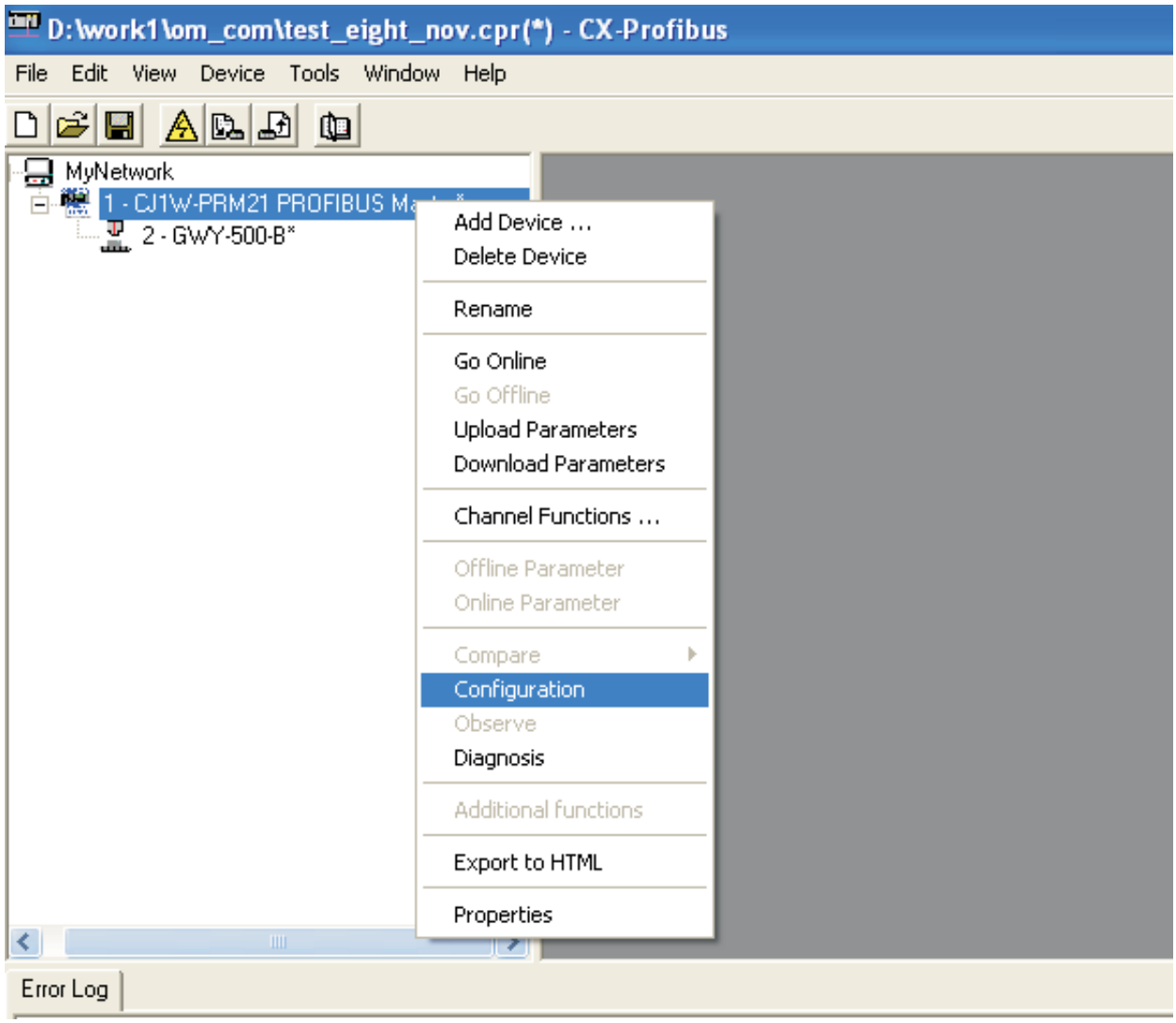


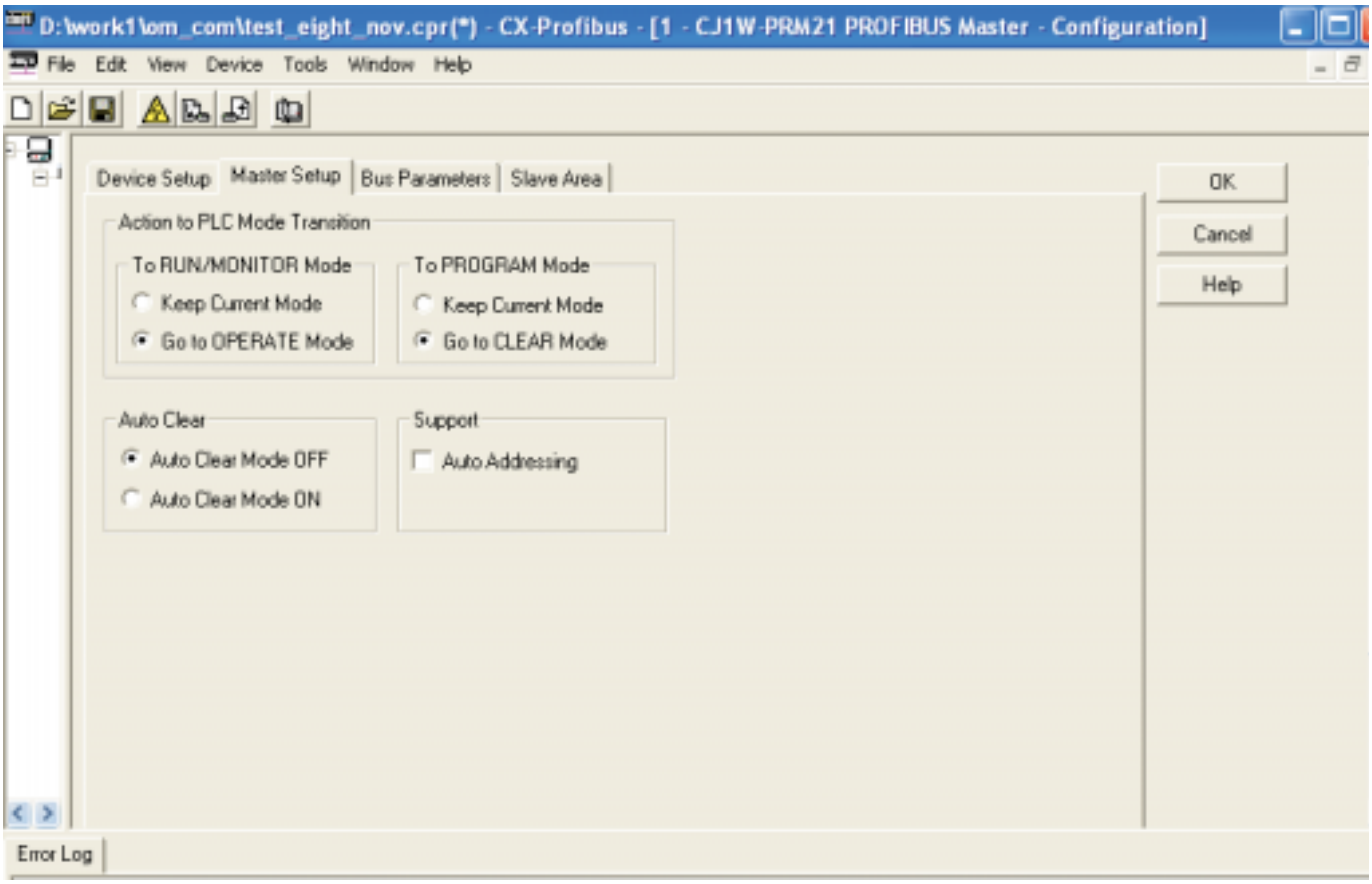
(c) In Group tab, assign the group for the slave, for global commands.



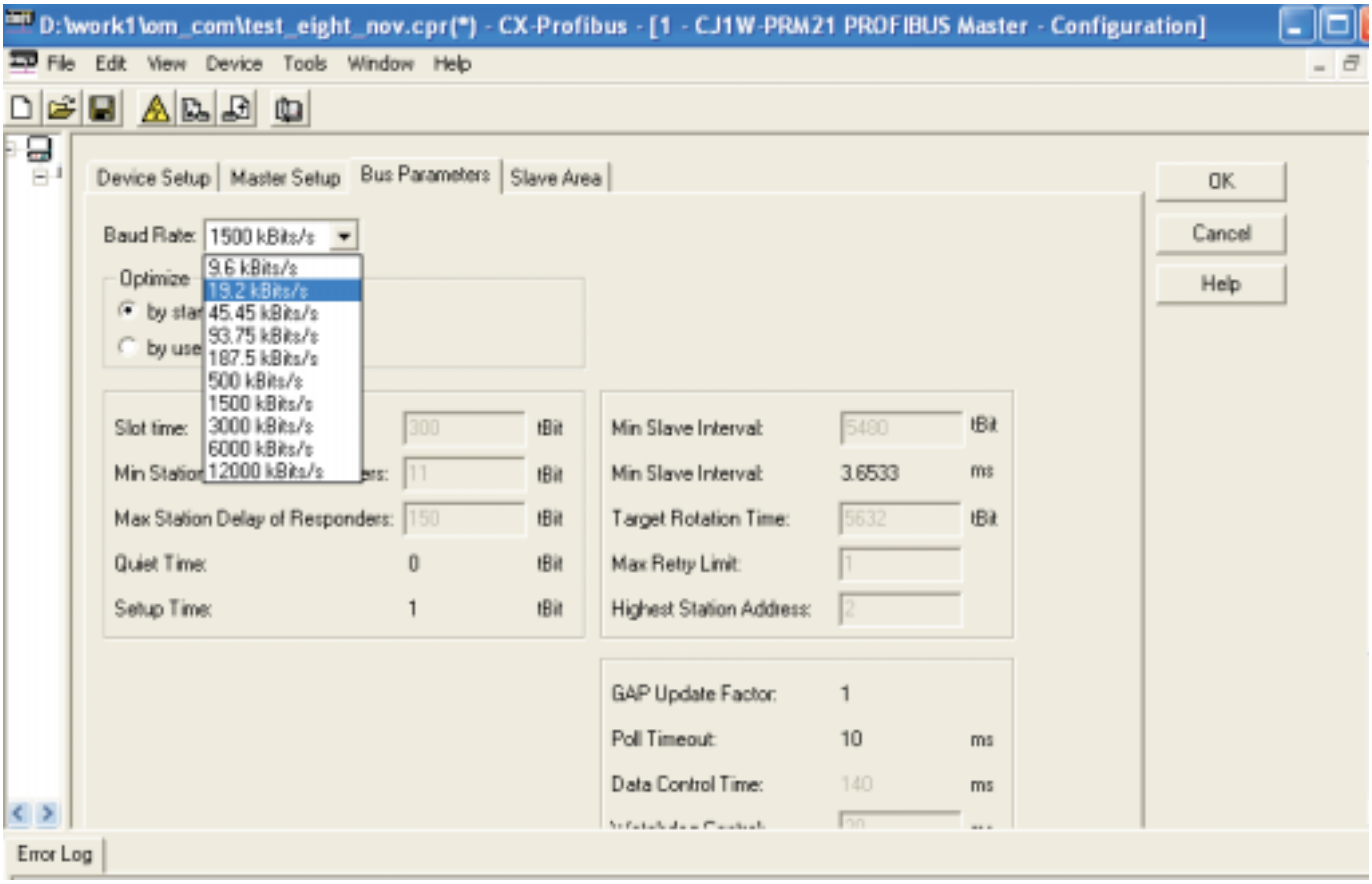

D:\work1\om_com\test_eight_nov.cpr - CX-Profibus - [2 - GWY-500-B - Configuration]
File Edit View Device Tools Window Help
Network
1 - CJ1W-PRM21 PROFIBUS Master
2 - GWY-500-B
Max. length of output data: 200 Byte
Length of output data: 32 Byte
Max. number of modules: 15
Number of modules: 2
Available Modules:
Module Name
Module Configuration Identifier
1 word Out (from master) 0xE0
2 words Out (from master) 0xE1
4 words Out (from master) 0xE3
8 words Out (from master) 0xE7
Insert
Append
Configured Modules:
Slot
Module Name
Module Configuration Identifier
1 16 words Out (from master) 0xEF
2 16 words In (to master) 0xDF
Remove
OK
Cancel
Apply
Help
Error Log
User: Administrator

4 Now configure Profibus master module as shown below




D:\work1\om_com\test_eight_nov.cpr(*) - CX-Profibus - [1 - CJ1W-PRM21 PROFIBUS Master - Configuration]
File Edit View Device Tools Window Help
Device Setup
Master Setup
Bus Parameters
Slave Area
OK
Cancel
Help
Action to PLC Mode Transition
To RUN/MONITOR Mode
Keep Current Mode
Go to OPERATE Mode
To PROGRAM Mode
Keep Current Mode
Go to CLEAR Mode
Auto Clear
Auto Clear Mode OFF
Auto Clear Mode ON
Support
Auto Addressing
Error Log

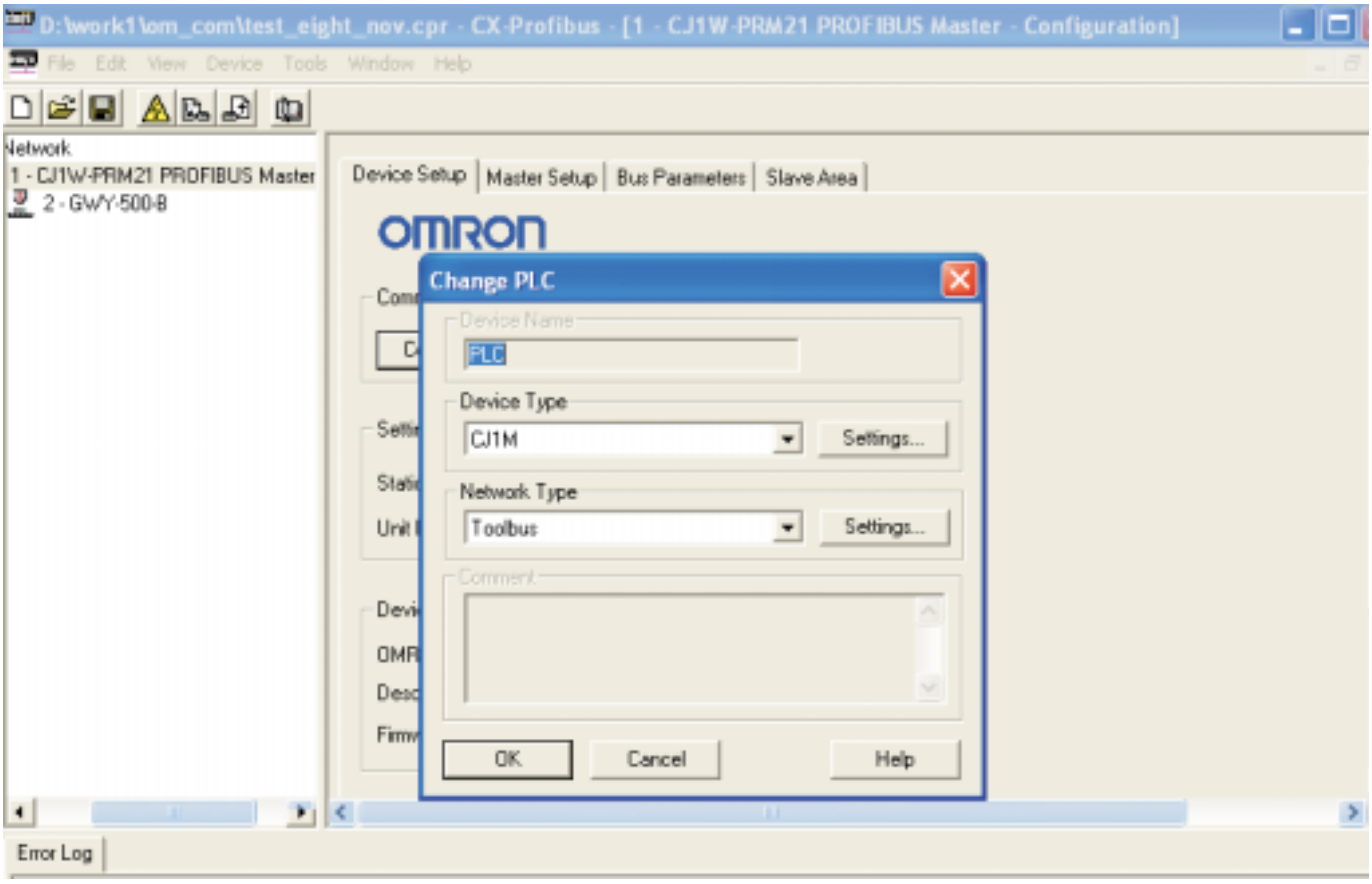
- You can change the baud rate in Bus Parameter tab.



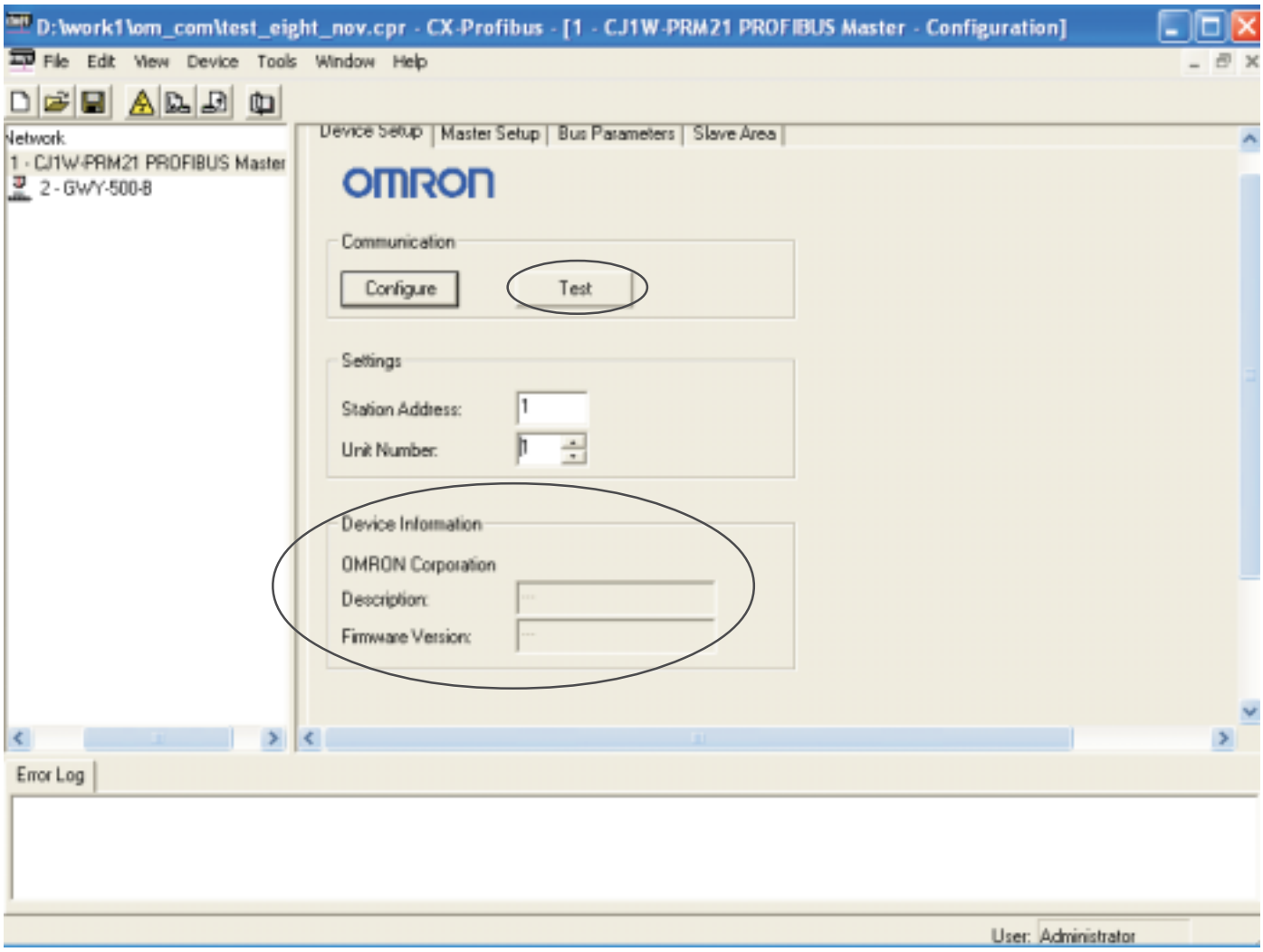
- In Omron master, some area is assigned for Input (Input to Master) and Output (output from master).

- In case of this project, it is CIO3300 for Input and CIO3200 for output. The type of PLC and communication port, Baud Rate should be specified in Device setup tab

Configure – Device Type – Settings
Configure – Network Type – Settings



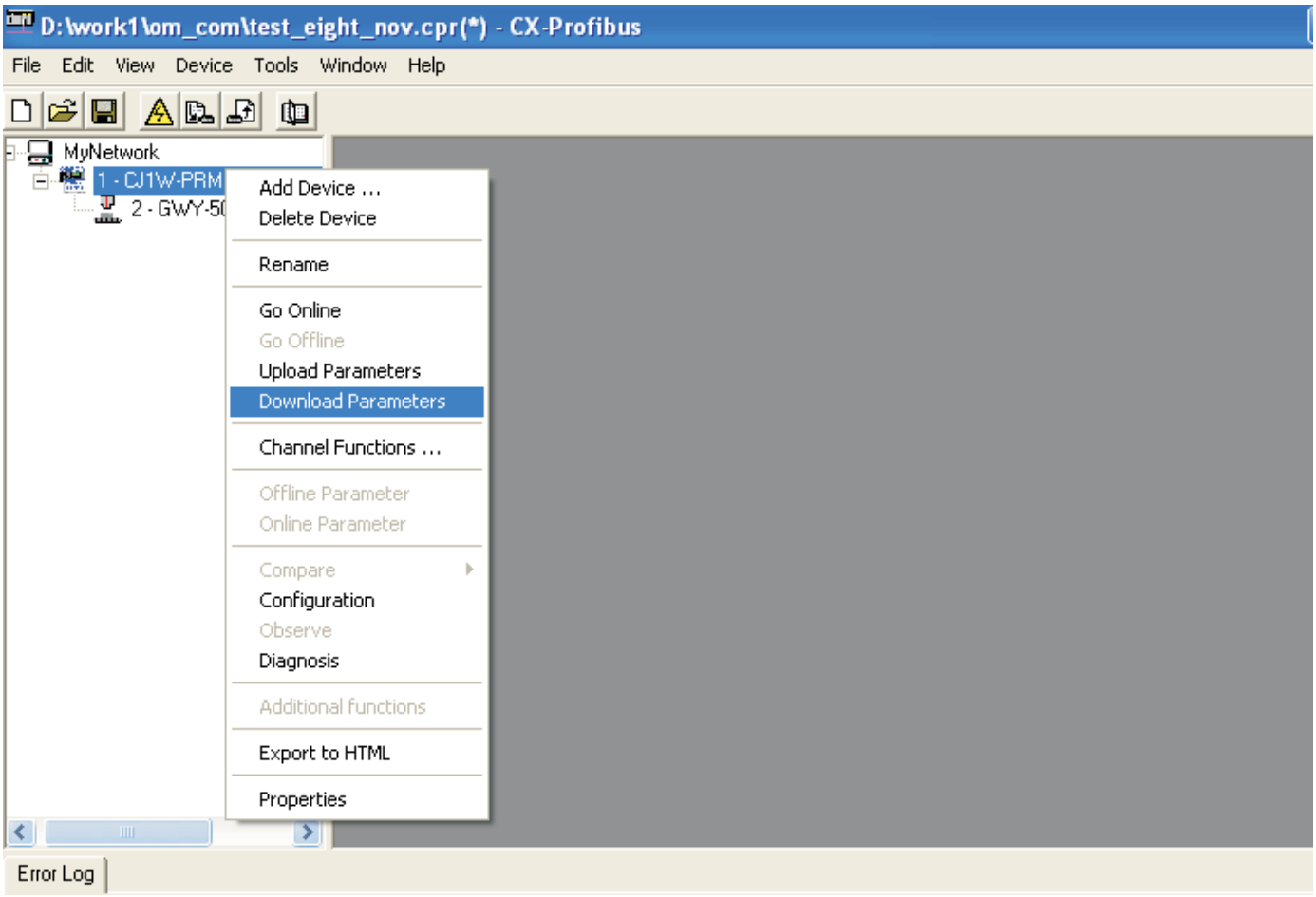
User can test the configuration by clicking the Test Tab.



After TEST, you should see the following in the Device Information

Item	Description
OMRON Corporation	This is fixed text, indicating the Manufacturer of the PROFIBUSDP Master Unit.
Description	This string will contain the name of the Unit, i.e. CJ1W-PRM21 or CS1W-PRM21.
Firmware Version	This string displays the firmware version, currently in the PROFIBUS-DP Master Unit.

5 Download the parameters in PLC.



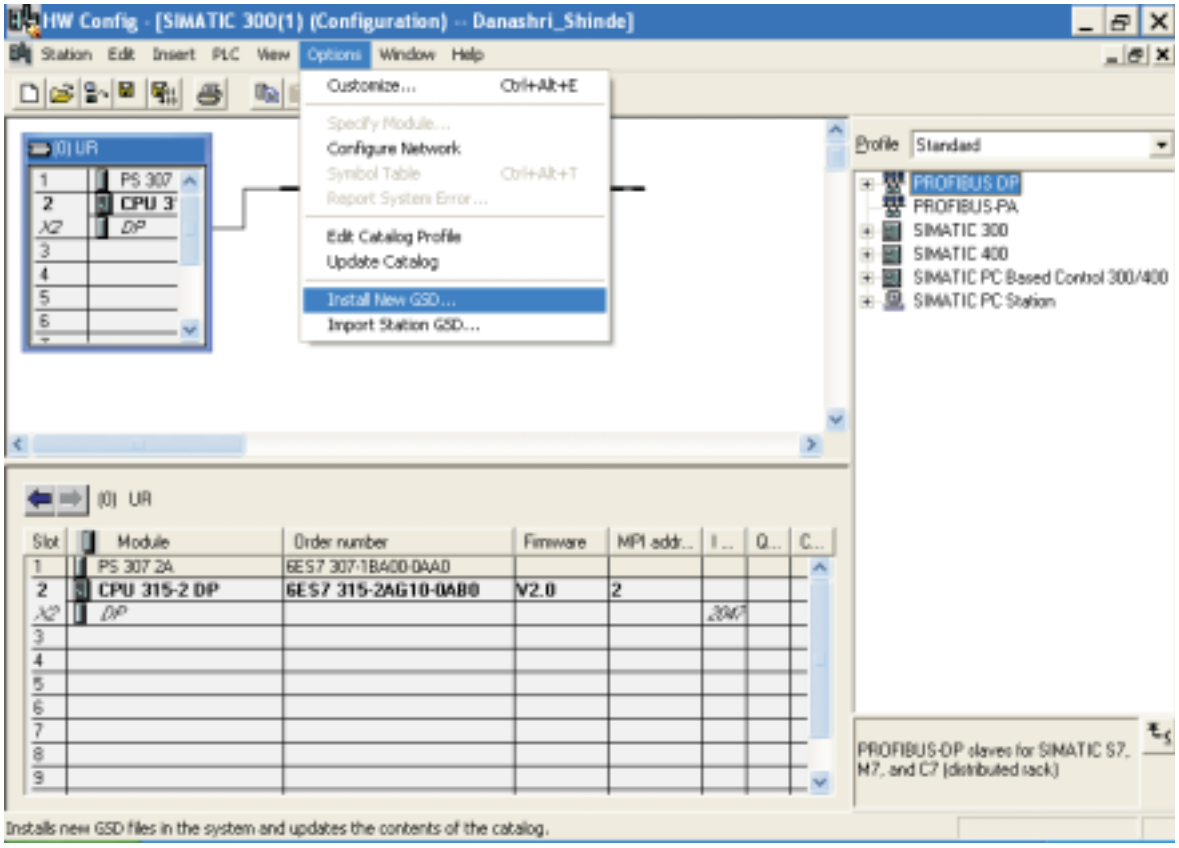
6 When The Slave starts communicating with master, the COMM led gets on.

7 User can watch the area CIO3200 and CIO3300 with help of CX- Programmer

8.2 Setup Of GWY-500-B with Siemens Profibus Master

1 If the slave is not of Siemens family, you need to install the GSD file for it.
H/W configuration – Option – Install New GSD

You can see the GSD file in Additional Field Devices in Hardware Catalog.

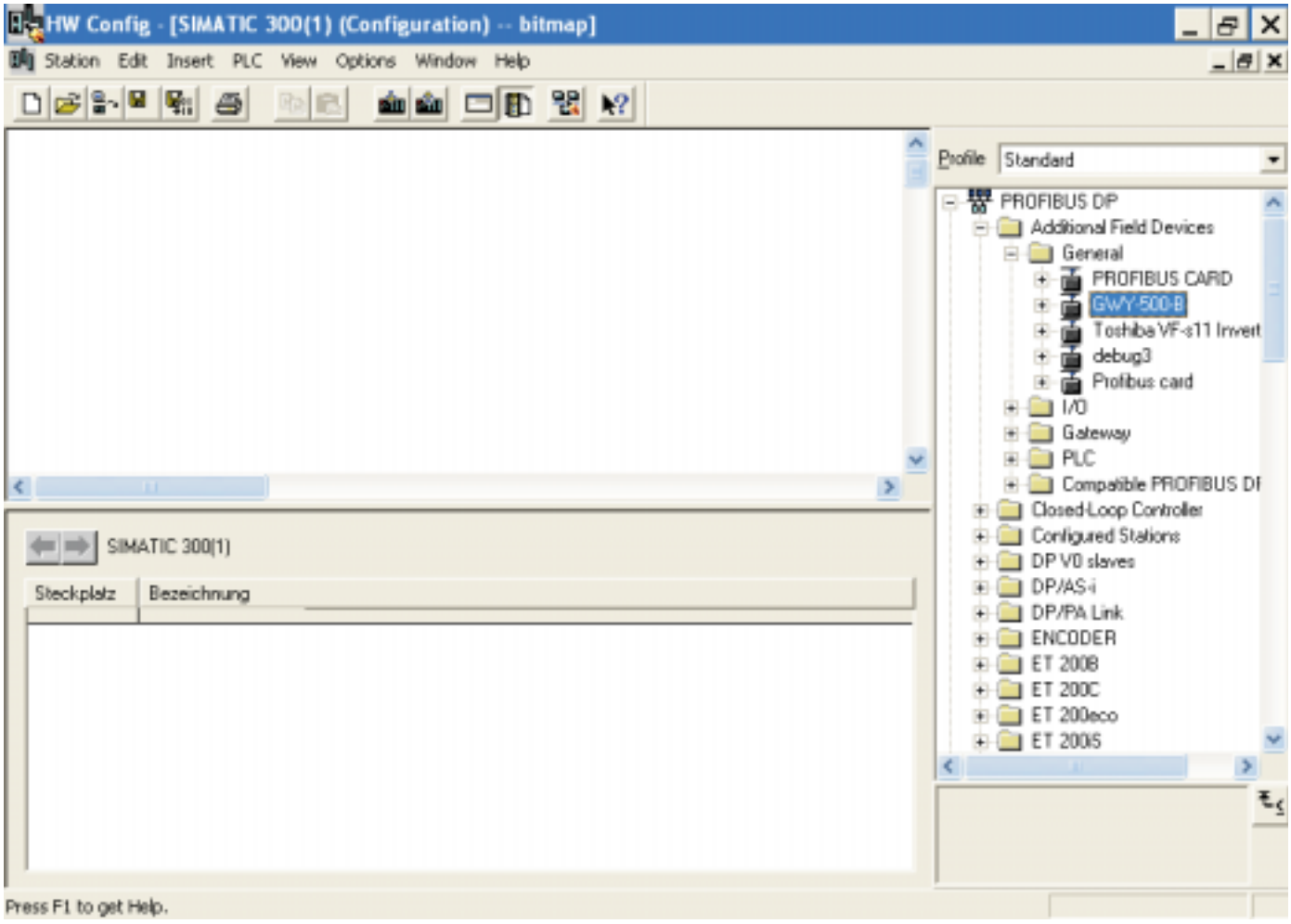


2 Next step is to form the Profibus Network.

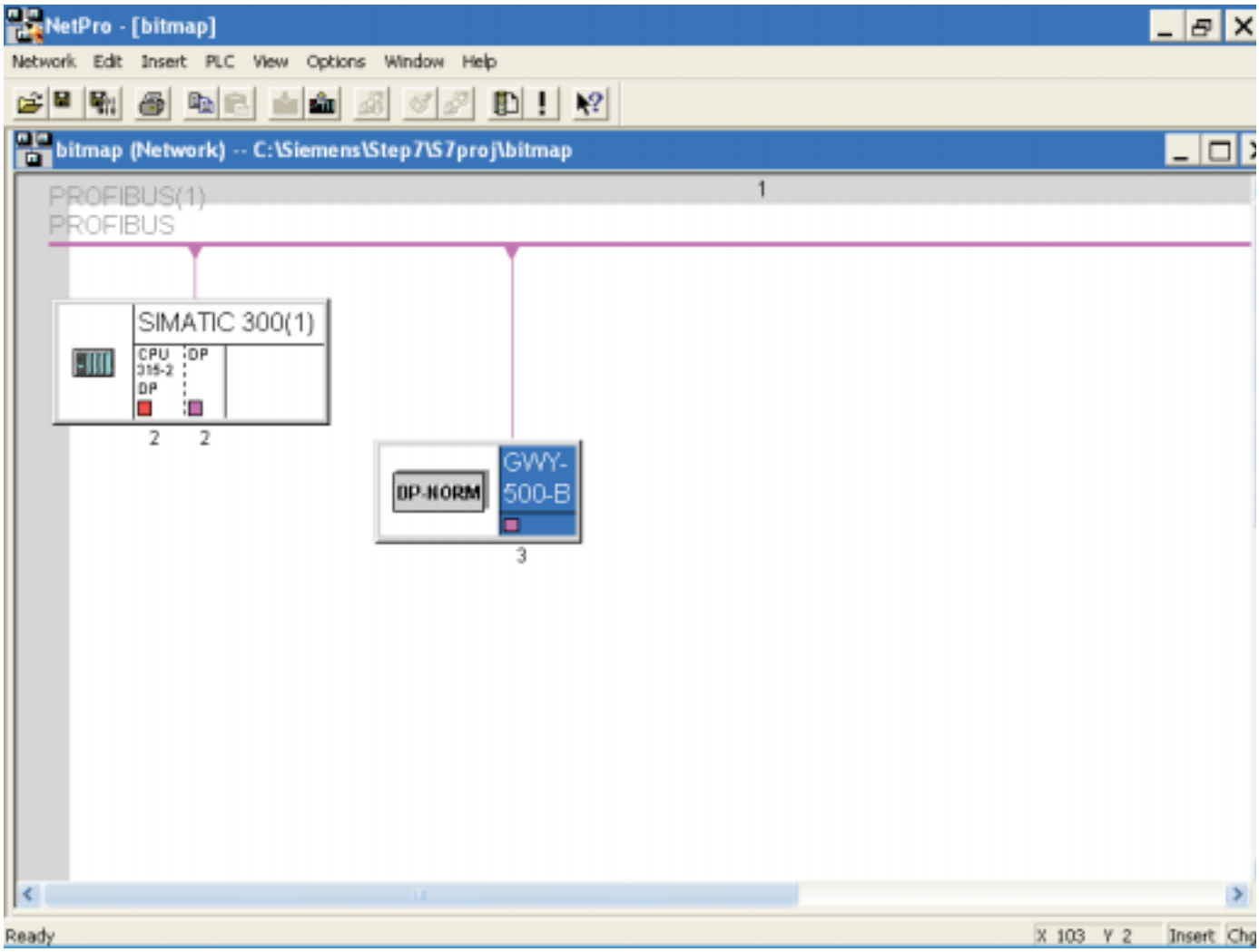
Refer Hardware Catalog for selecting the devices:

(a) In Rack 0, slot 2, user should enter CPU (i.e. Siemens Master)

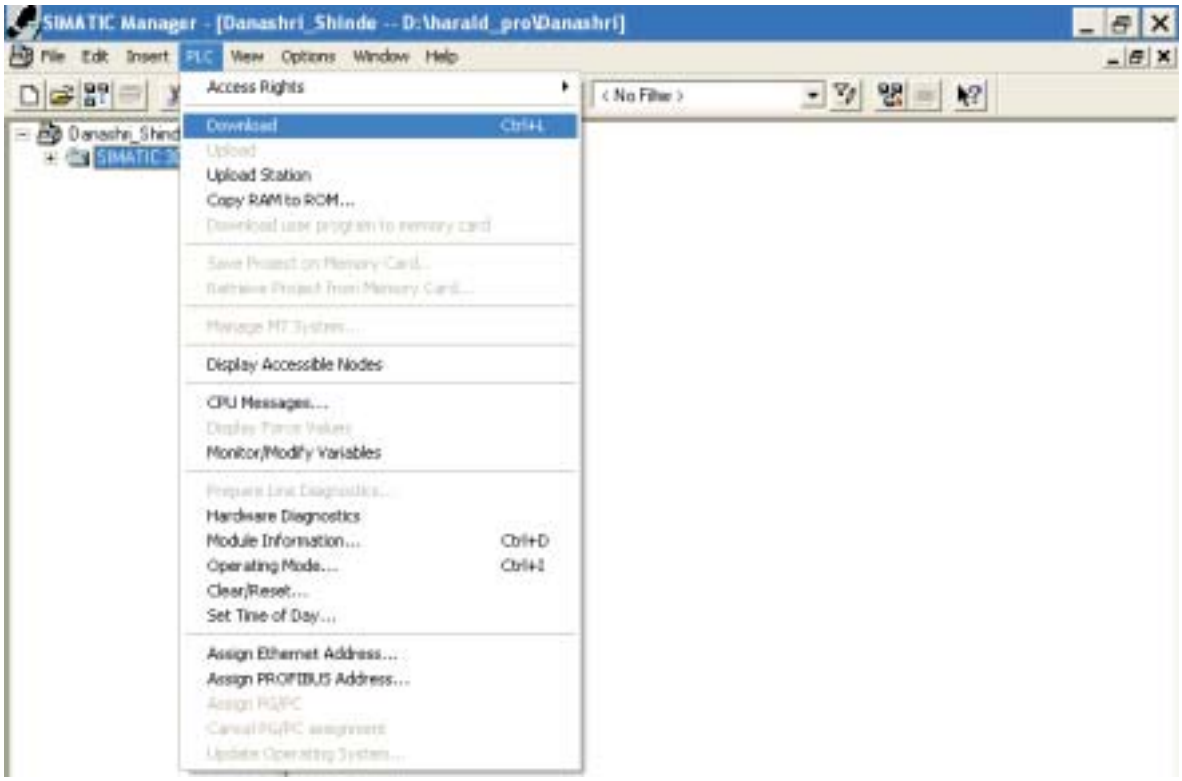
(b) Slave module is added in front of Master module.



3 You can see the configuration in
Hardware Configuration - Option – Configure Network

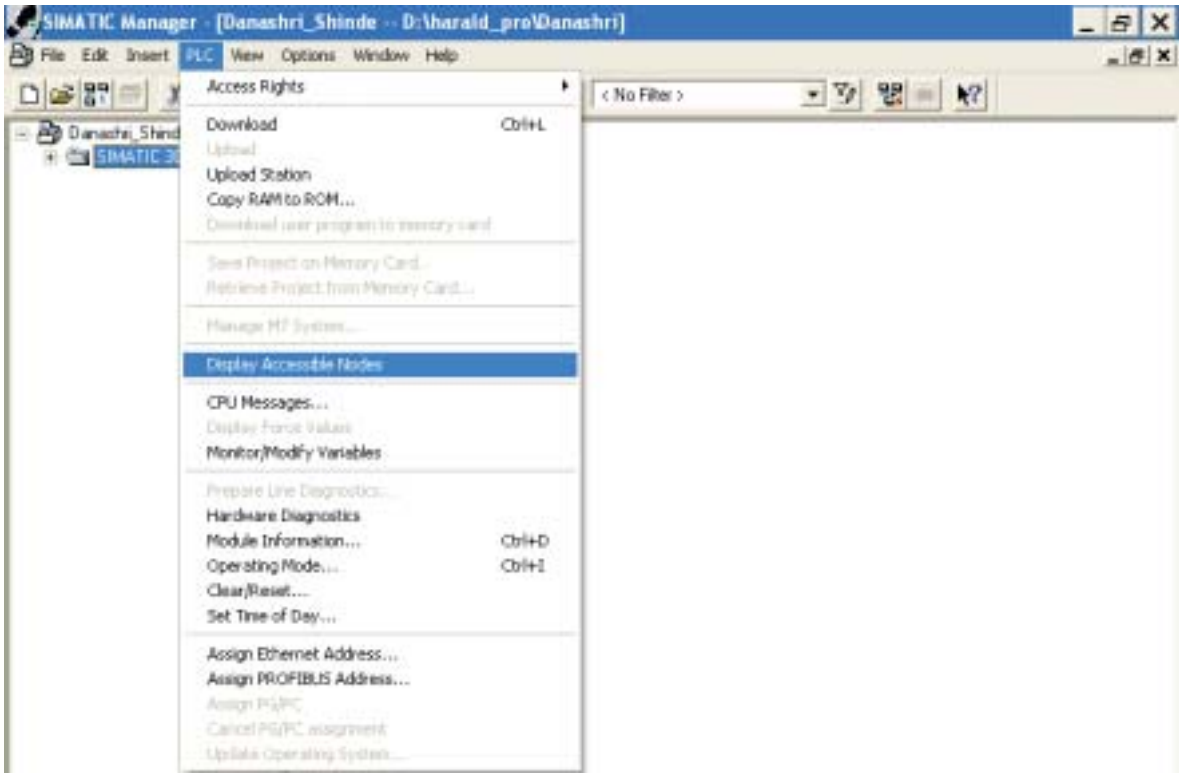


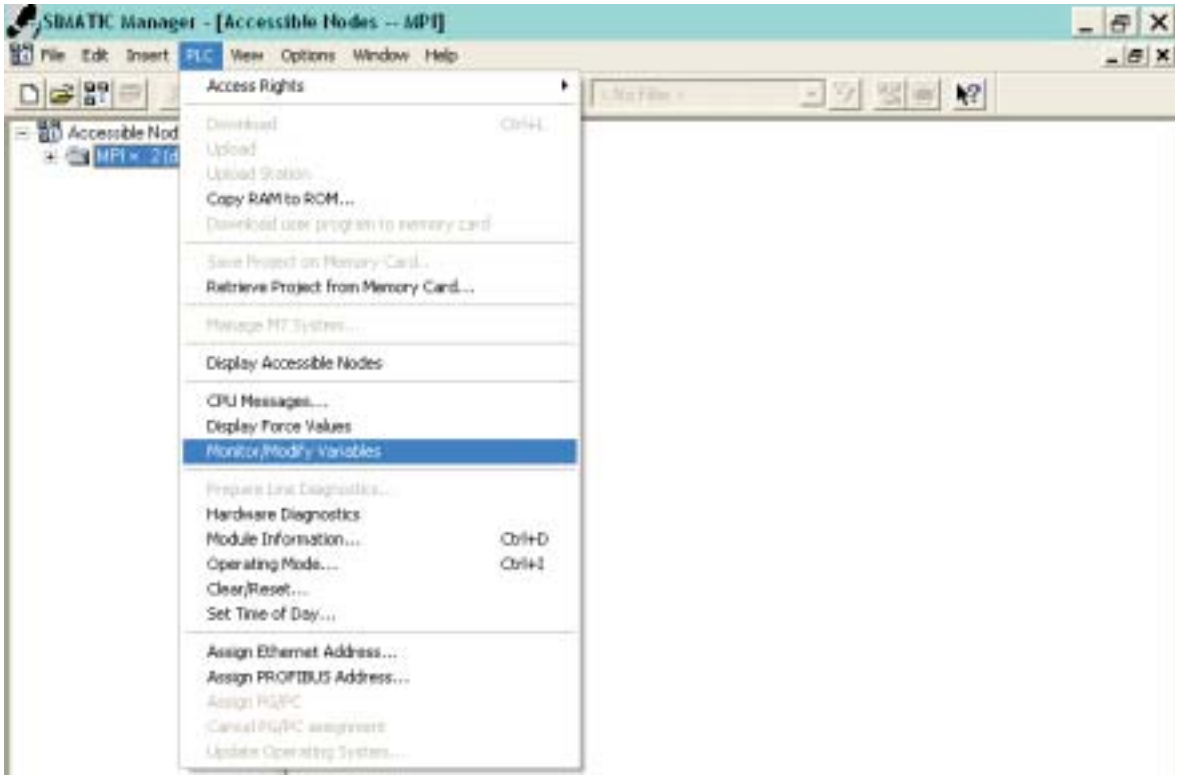
4 Download the configuration to PLC.

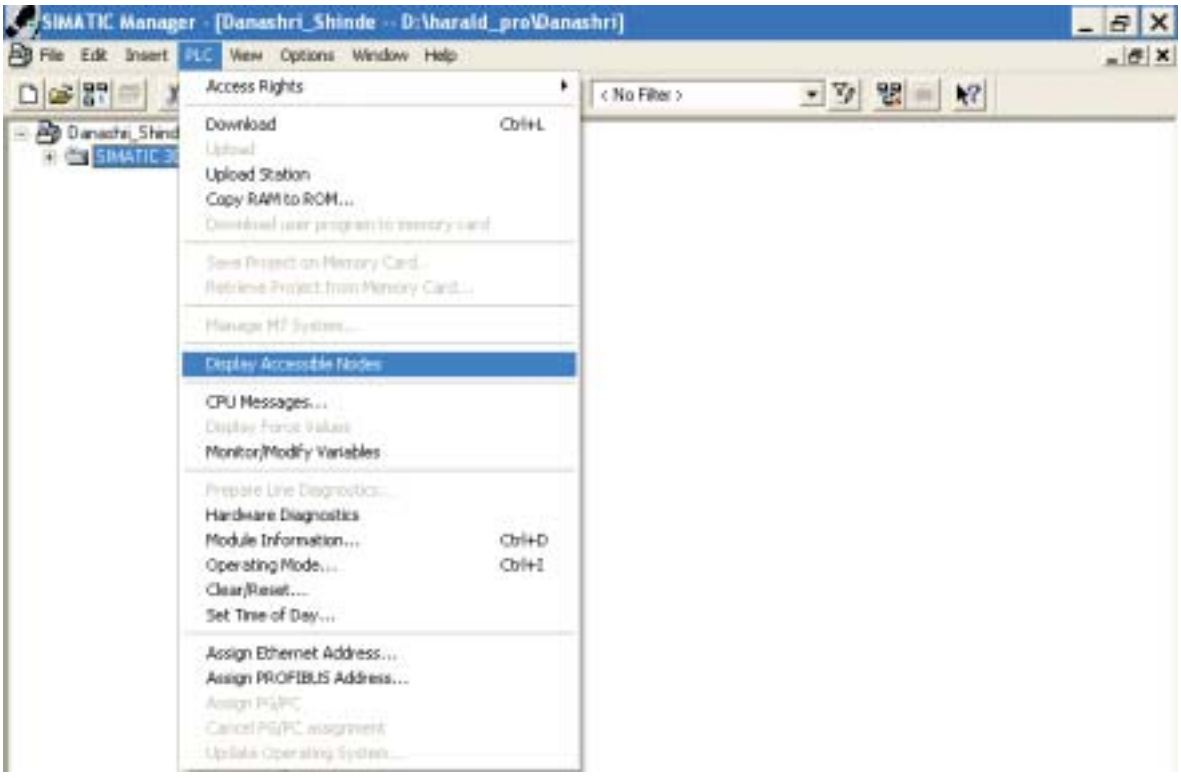


5 After downloading is complete, and communication is established, the BF and SF LED goes off.

6. You can monitor the variables as PLC – Monitor/Modify variables.




SIMATIC Manager - [Accessible Nodes -- MPI]
File Edit Insert PLC View Options Window Help
Access Rights
Download Ctrl+L
Upload
Upload Station...
Copy RAM to ROM...
Download user program to memory card...
Save Project on Memory Card...
Retrieve Project from Memory Card...
Manage MT System...
Display Accessible Nodes
CPU Messages...
Display Force Values
Monitor/Modify Variables
Prepare Line Diagnostics...
Hardware Diagnostics
Module Information... Ctrl+D
Operating Mode... Ctrl+I
Clear/Reset...
Set Time of Day...
Assign Ethernet Address...
Assign PROFIBUS Address...
Assign PG/PC...
Cancel PG/PC assignment
Update Operating System...


SIMATIC Manager - [Danashri_Shinde -- D:\harald_pro\Danashri]
File Edit Insert PLC View Options Window Help
Access Rights
Download Ctrl+L
Upload
Upload Station
Copy RAM to ROM...
Download user program to memory card...
Save Project on Memory Card...
Retrieve Project from Memory Card...
Manage MT System...
Display Accessible Nodes
CPU Messages...
Display Force Values
Monitor/Modify Variables
Prepare Line Diagnostics...
Hardware Diagnostics
Module Information... Ctrl+D
Operating Mode... Ctrl+I
Clear/Reset...
Set Time of Day...
Assign Ethernet Address...
Assign PROFIBUS Address...
Assign PG/PC...
Cancel PG/PC assignment
Update Operating System...
< No Filter >

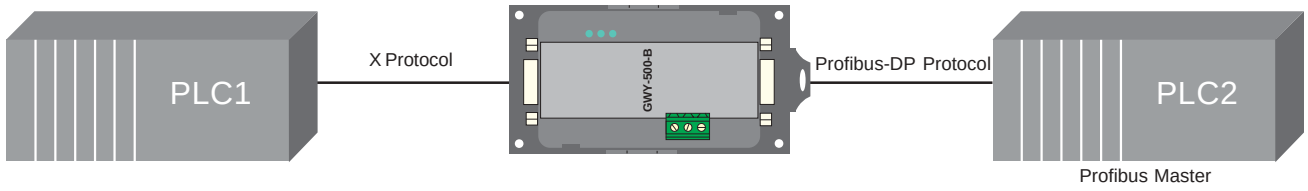
APPLICATIONS

In this chapter. . . .

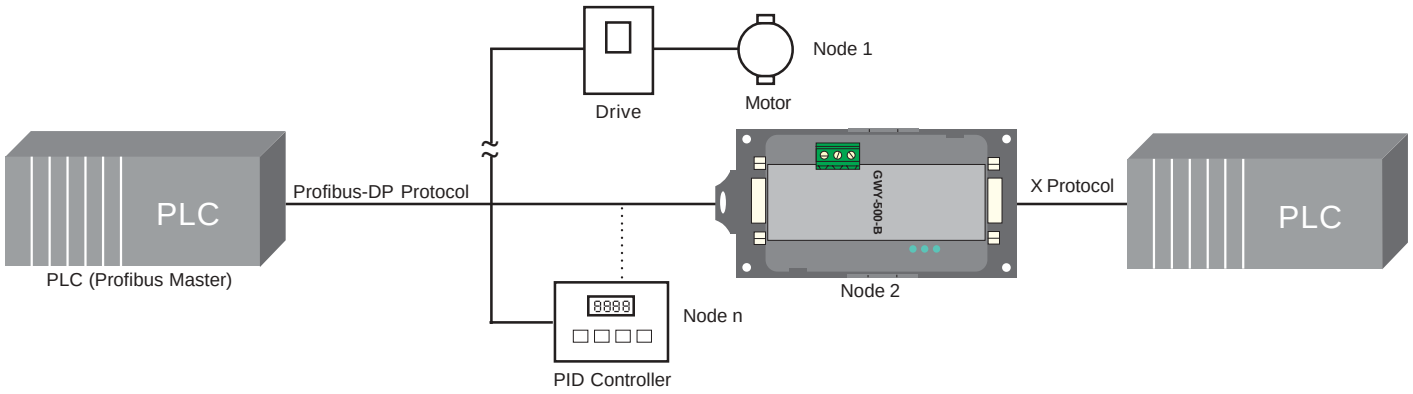
- Possible Applications using GWY-500-B

9.1 Possible Applications of GWY-500-B

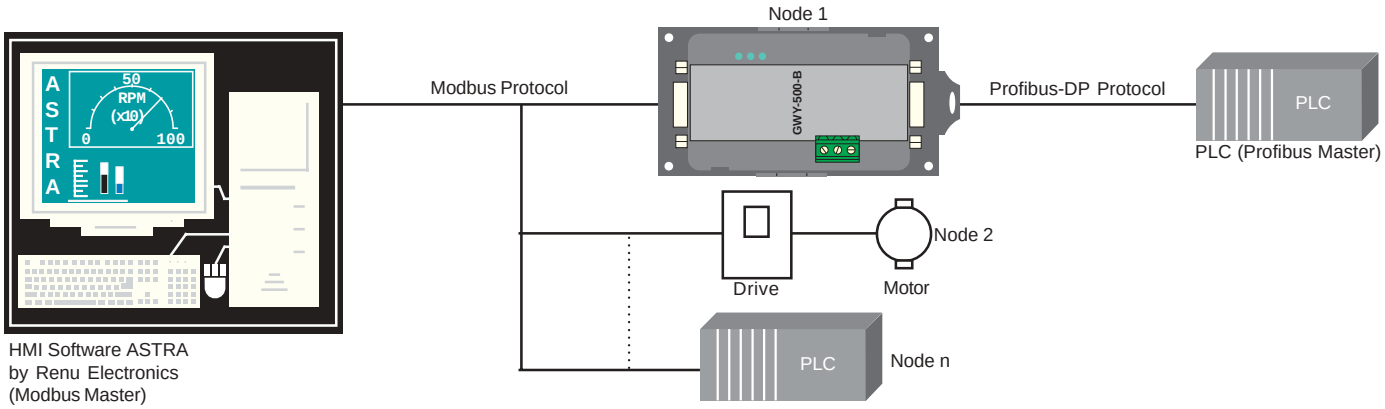
1.PLC To PLC Communication



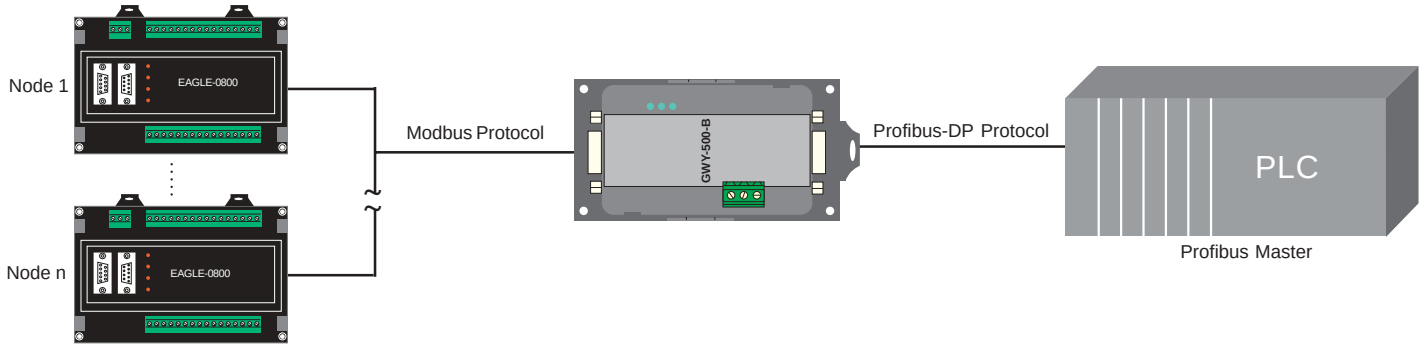
2. PLC as a Slave in Profibus Network



3. PLC (Profibus Master) as a Slave in Modbus Network



4. Add I/O to your PLC



Eagle Analog I/O
Example: Eagle0800
by Renu Electronics

* Images not to scale.